

**Course Title:** Prosthetics & Orthotics

**Course Number:** PHT 6702C

**Course Semester and Year:** 2014 Summer Semester, Year 2

**Course Prerequisites:** Course participation is limited to the entry-level DPT student in his/her second year of the UF program.

**College:** Public Health and Health Professions

**Department:** Department of Physical Therapy, University of Florida

**Credit Hours:** 2

**Course Location:** Building – HPNP, Room – 1104

**Course Dates and Times:** Mondays, 8:30AM – 11:30AM;

Thursdays, 9:30AM - 11:30AM

**Course Instructor:** Donovan Lott PT, PhD, CSCS

**Email Address:** [djlottpt@php.ufl.edu](mailto:djlottpt@php.ufl.edu)

**Phone:** (352) 273-9226

**Office:** J397 of BMS building

**Office Hours:** By appointment

**Course Description:**

Management of patients with amputations and conditions requiring orthotics will be emphasized. The basic components of the course include types of orthotics and prosthetics, fitting, exercise programs, gait analysis and gait training. A brief overview of upper extremity orthotics and prosthetics will be provided.

**Course Objectives:**

Upon completion of this course the student will be able to:

1. Discuss how the Physical Stress Theory relates to the clinical application of orthotics and prosthetics.
2. Define orthotics.
3. Discuss the major components of an orthosis and how it can affect alignment or gait.
4. Discuss how controlling the foot and ankle can control the knee.
5. Determine the correct orthosis for a given gait deviation.
6. Describe and discuss orthotics for controlling the hip and spine.
7. Evaluate the foot and ankle for a foot orthosis.
8. Discuss the use of orthotics for prevention of injury in sports and for protection after surgery.
9. Discuss the care for the neuropathic foot including the use of orthotics.
10. Describe and discuss orthotics for controlling the upper extremity.
11. Describe and discuss orthotics for selected specific conditions such as Legg-Perthes disease.
12. Differentiate between dynamic and static splinting.
13. Construct a simple splint of thermoplastic materials.
14. Discuss the development and history of amputation and prosthetics.
15. Discuss the major causes of amputation and the relationship of cause to expected outcome.
16. Determine appropriate pre-operative care and education for the lower extremity amputee,

- including pre-operative positioning and exercise based on examination findings.
17. Briefly describe the different levels of amputation and the types of prostheses available.
  18. Recognize and recommend appropriate post-operative care and education for the lower extremity amputee, including positioning, exercises, hygiene procedures for residual limb care, residual limb wrapping, home program, and psychological support based on the examination findings.
  19. Differentiate the basic components, biomechanics and alignment, fabrication and fitting principles of prosthetic devices with emphasis on the lower extremities.
  20. Select the appropriate prosthetic device based on the patient's diagnosis, sex, age, life style, environmental considerations and other important examination findings.
  21. Apply and discuss the knowledge of biomechanics and the normal gait cycle as related to the amputee.
  22. Analyze common gait deviations for both the transfemoral and the transtibial amputees and determine the possible prosthetic and amputee causes.
  23. Describe and organize an initial/final checkout evaluation for patients with transfemoral and transtibial prostheses.
  24. Design a prosthetic training program for both a transfemoral and a transtibial amputee that includes exercises and techniques to improve gait.
  25. Evaluate a patient scenario and determine the possible causes for gait deviations for that particular patient.
  26. Discuss the basic levels of amputation and function at each level for a patient with an upper extremity amputation.
  27. Identify, describe, and compare the basic components of an upper extremity prosthesis and discuss the mechanical operation and control of the prosthesis.
  28. Recognize the need for regular communication and participation with the patient and family regarding the evaluation and treatment planning process, including goal setting and plan of care.

### **Teaching Methods and Learning Experiences:**

The course will include lectures, small group activities and discussions, lab sessions, and problem solving case studies. Analysis of video-taped gait will be expected. Guest lectures and labs will involve professionals in the community and persons with amputations from the community. Additionally, students will be asked to review the literature to answer questions about evidence for best practice. Written and oral presentation will be required.

### **Readings:**

The course instructor will assign some required journal articles for lecture material.

There is no textbook that is required for this course.

The following textbook is suggested:

Lusardi, MM and Nielsen, CC. *Orthotics and Prosthetics in Rehabilitation, Second Edition*. St. Louis, Missouri: Saunders Elsevier. 2007.

The following are recommended references:

May, BJ and Lockard, MA. *Prosthetics & Orthotics in Clinical Practice: A Case Study Approach*. Philadelphia, PA: FA Davis Company 2011.

Edelstein, JE and Moroz, A. *Lower-Limb Prosthetics and Orthotics: Clinical Concepts*. Thorofare, NJ: SLACK Incorporated 2011.  
Seymour, R. *Prosthetics And Orthotics, Lower Limb and Spinal*. Baltimore, MD: Lippincott Williams & Wilkins. 2002.  
Gailey, RS. *One Step Ahead, An Integrated Approach to Lower Extremity Prosthetics and Amputee Rehabilitation*. Miami, FL: Advanced Rehabilitation Therapy, Inc. 1994.  
O'Sullivan, SB and Schmitz, TJ. *Physical Rehabilitation, Fifth Edition*. Philadelphia, PA: FA Davis Company 2007.

**Responsibilities of the student:**

Students are expected to attend and be prepared for all lecture and laboratory sessions. Students are expected to arrive to lecture and lab sessions in a punctual manner, and with the appropriate clothing and equipment. Students must notify the office (273-6085) and the course instructor of any absences from class. Readings must be done prior to class so that discussion of the material may take place.

**Student evaluation:**

Performance of the student will be evaluated by written quizzes, a written final exam, assignments, oral presentations, and assessment of student's display of professionalism during lecture and class sessions. There will be five short quizzes (multiple choice, T/F, short answer) given at the beginning of selected class periods (25% of grade). The student will be evaluated on his/her performance on a final written examination (multiple choice, T/F, matching, short answer) (40% of grade). The literature review assignment and presentation will be worth 35% of grade. The student will be expected to read any assigned materials **prior** to class and to **participate in discussions** led by the instructor and/or guest lecturers. **Points may be deducted for lack of participation and for lack of professionalism.**

Grading is scored according to the grading policy; University of Florida, College of Health Professions, Department of Physical Therapy, Student Handbook.

93-100 =	A 4.00 grade point
90-92 =	A- 3.67 grade point
87-89 =	B+ 3.33 grade point
83-86 =	B 3.00 grade point
80-82 =	B- 2.67 grade point
70-79 =	C 2.00 grade point
60-69 =	D 1.00 grade point
Below 60 =	E 0 grade point

### **Literature Review Group Assignment:**

There will be 6 groups and each group will have a question to research.

Research the most recent literature. Each group is to select 6 articles from refereed journals, analyze the studies, case reports, etc, and report on each article to the group via a power point presentation. **Please use the most up-to-date publications available and follow the directions below:**

- 1. Critically review each article (as learned in the EBP I and II)**
- 2. Rank the 6 articles in order of best evidence.**
- 3. Prepare and present a power point presentation for the class that includes discussion of the 6 articles and your conclusion to the research question.**
- 4. Email the instructor a copy of your power point and soft copies of the 6 articles you use at least 24 hours prior to your presentation.**

The student led group presentations will be expected to last a **minimum of 17 minutes and a maximum of 25 minutes**. This time includes the presentation only. Discussion and the question/answer period will follow. Failure to adhere to this amount of time to present will result in a reduction of at least 10% in the score for the group. There is no standard format for the presentations, but students are encouraged to use methods that appeal to a wide range of learning styles and have fun (within reason while remaining professional).

Students will work in groups, and each member of the group will receive the same grade. Grading criteria include 1) Technical aspects of the presentation adhered to guidelines provided in EBP II; 2) Oral presentation demonstrated appropriate skills discussed in EBP II; 3) Content of presentation included a review of 6 relevant journal articles; 4) Conclusion to the research question was presented in a clinically relevant manner; 5) Creativity and originality; and 6) Class participation. Grading will be on a 0-5 scale for each criterion. Failure to adhere to the time to present of 17-25 minutes will result in a reduction of at least 10% in the score for the group. See the final page of the syllabus for more details concerning the grading criteria for this assignment.

### Group Assignment Literature Review Questions and Last Names for Each Group

1. What is the evidence for best practice when using an orthosis in the management of children with spastic hemiplegia? Group 1: Yarchin, Rogozinski, Hardin, Turner, Mehta, Carter, Perez, Bozich, Patel
2. What is the evidence for best practice when using an orthosis in the management of patients with carpal tunnel syndrome? Group 2: Marcoux, Wickham, Mathai, Wyatt, Khirbat, Sterba, Caton, Murphy, Tushe
3. What is the evidence for best practice when using orthoses in the management of patients with adolescent idiopathic scoliosis? Group 3: Stewart, Leon, Yarbrough, Ramirez, Hannibal, Triacca, James, Trevino, Huempfer
4. What is the evidence for best practice in the treatment of phantom limb pain? Group 4: Smith, Gibbs, Seamon, Garay, Parker, Bohne, Park, Bergh, Norman

5. What is the evidence for best practice regarding a microprocessor prosthetic foot for persons with a transtibial amputation? Group 5: Anderson, Downer, Rohde, Rufo, Froiseth, Tokics, Coggin, Wharton, Holt
6. What is the evidence for best practice in choosing a prosthetic knee for the patient with a transfemoral amputation? (microprocessor knee (C-Leg or Intelligent Leg) versus some other type mechanical knee) Group 6: Herder, Swanson, Hixon, Tisdale, Bouwkamp, Major, Variuer, Litz, Van Rees, Link

Any changes to the names in the above schedule must be formally approved by the instructor no later than May 21<sup>st</sup>.

**Course Outline – Schedule subject to change:**

The course instructor can (and will) make changes to this schedule at his discretion. All changes will be announced during class time or by email (to UF address).

<u>Date</u>	<u>Topic</u>
May 12 <sup>th</sup>	Course Intro, Introduction Physical Stress Theory, Orthotic Overview <i>Suggested Reading</i> Lusardi and Nielsen Chapters 1, 7, 10, 11 (pp. 237-250) , 13 <i>Required Reading</i> Mueller MJ and Maluf KS. Tissue Adaptation to Physical Stress: A Proposed “Physical Stress Theory” to Guide Physical Therapist Practice, Education, and Research. <i>PTJ</i> 2002;82:383-403.
May 15 <sup>th</sup>	Foot Orthotic Lab <i>Suggested Reading</i> Lusardi and Nielsen Chapter 9
May 19 <sup>th</sup>	Continuation of Foot Orthotics, Hip, HKAFO, Congenital & Developmental Impairments, Spine, UE <i>Suggested Reading</i> Lusardi and Nielsen Chapters 11 (pp. 250-261), 14, 15, 16
**May 22 <sup>nd</sup>	Splinting lab in OT classroom/lab HPNP room 1107** <i>Suggested Reading</i> Lusardi and Nielsen Chapter 17
May 26 <sup>th</sup>	<b>NO CLASS</b>
May 29 <sup>th</sup>	<b>NO CLASS</b>
June 2 <sup>nd</sup>	Etiology, preventive and pre-operative care; overview of LE amputations; post-op care; neuropathic foot; phantom limb; residual limb wrapping <i>Suggested Reading</i>

Lusardi and Nielsen Chapters 20, 21, 22, 23

**QUIZ #1**

**GROUP 1 PRESENTS**

June 5<sup>th</sup>

Prosthetic Fabrication

June 9<sup>th</sup>

TT components, alignment, assessment, and gait deviations

*Suggested Reading*

Lusardi and Nielsen Chapters 24, 25, 26

**GROUP 2 PRESENTS**

June 12<sup>th</sup>

**NO CLASS**

June 16<sup>th</sup>

TT prosthetic checkout and cases

*Suggested Reading*

Lusardi and Nielsen Chapter 27

**QUIZ #2**

**GROUP 3 PRESENTS**

June 19<sup>th</sup>

**NO CLASS**

June 23<sup>rd</sup>

TF components & rationale for prescription, TF alignment, assessment

*Suggested Reading*

Lusardi and Nielsen Chapter 28

**GROUP 4 PRESENTS**

June 26<sup>th</sup>

**NO CLASS**

June 30<sup>th</sup>

**NO CLASS**

July 3<sup>rd</sup>

**NO CLASS**

July 7<sup>th</sup>

TF gait deviations; distal femur rotation plasty; B TF; hip disarticulation

*Suggested Reading*

Lusardi and Nielsen Chapters 30, 22 (pp. 575)

**QUIZ #3**

July 10<sup>th</sup>

TF checkout; prosthetic training; Exercise plan; Gait Training

*Suggested Reading*

Lusardi and Nielsen Chapter 29

**QUIZ #4**

July 14<sup>th</sup>

Pediatric considerations; Cases

**QUIZ #5**

**GROUPS 5 & 6 PRESENT**

July 17 <sup>th</sup>	UE prosthetics <i>Suggested Reading</i> Lusardi and Nielsen Chapter 32, 33
July 21 <sup>st</sup>	<b>NO CLASS</b>
July 24 <sup>th</sup>	<b>NO CLASS</b>
July 28 <sup>th</sup>	<b>FINAL EXAM</b>
July 31 <sup>st</sup>	<b>NO CLASS</b>

**Statement of University's Honesty Policy (cheating and use of copyrighted materials)**

**Academic Integrity:**

Students are expected to act in accordance with the University of Florida policy on academic integrity (see Student Conduct Code, the Graduate Student Handbook or these web sites for more details:

<http://www.dso.ufl.edu/sccr/honorcodes/conductcode.php>

<http://www.dso.ufl.edu/studenthandbook/studentrights.php>

<http://gradschool.ufl.edu/students/introduction.html>

Cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*

**Policy Related to Class Attendance**

**Policy Related to Make-up Exams or Other Work**

**Attendance and Make-up Work**

I expect you to attend and be prepared to participate in all class sessions. Personal issues with respect to class attendance or fulfillment of course requirements will be handled on an individual basis.

**Statement Related to Accommodations for Students with Disabilities**

**Accommodations for Students with Disabilities**

If you require classroom accommodation because of a disability, you must first register with the Dean of Students Office (<http://www.dso.ufl.edu/>). The Dean of Students Office will

provide documentation to you, which you then give to the instructor when requesting accommodation. The College is committed to providing reasonable accommodations to assist students in their coursework.

### **Counseling and Student Health**

Students may occasionally have personal issues that arise in the course of pursuing higher education or that may interfere with their academic performance. If you find yourself facing problems affecting your coursework, you are encouraged to talk with an instructor and to seek confidential assistance at the UF Counseling & Wellness Center, 352-392-1575. Visit their web site for more information: <http://www.counseling.ufl.edu/>.

The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services, including primary care, women's health care, immunizations, mental health care, and pharmacy services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: [www.health.ufl.edu/shcc](http://www.health.ufl.edu/shcc)

Crisis intervention is always available 24/7 from:

Alachua County Crisis Center:

(352) 264-6789

<http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx>

BUT – Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

### **Class Demeanor Expected by the Professor**

Ensure cell phones are turned off during class time.

Be on time to all class and lab sessions.

Avoid using laptop computers for tasks that are not pertinent to the lecture/lab session.

# Assessment of Literature Review Group Assignment

Date of Presentation: \_\_\_\_\_

Topic/Title of Presentation: \_\_\_\_\_

*Please rate the Student Led Topic Presentation for the following criteria using a 0-5 point scale (0=unacceptable; 1=poor; 2=fair; 3=adequate; 4=good; 5=excellent).*

- 1) Technical: Slides for presentation adhered to appropriate presentation guidelines (i.e. number of slides for time allowed, sufficient yet not excessive use of text and pictures, slides up for an adequate amount of time, etc.).

\_\_\_\_\_

- 2) Oral Presentation: Presenters used appropriate speed and volume while speaking, spoke clearly, demonstrated enthusiasm for the subject matter, and followed appropriate presentation skills.

\_\_\_\_\_

- 3) Content: Presenters used 6 relevant journal articles, adequately described the studies (sufficient yet not excessive background information, methods employed, etc.), and explained how the results were interpreted and their potential impact in that area of research.

\_\_\_\_\_

- 4) Conclusion to the research question was presented in a clinically relevant manner (one in which a physical therapist could obtain useful information in making a decision concerning the care of a patient with the condition pertinent to the question posed).

\_\_\_\_\_

- 5) Creativity: Presenters demonstrated originality and creativity.

\_\_\_\_\_

- 6) Class Participation: Presenters facilitated class participation and/or discussion (engaged the audience, responded to questions effectively, etc.).

\_\_\_\_\_