

## BMD\_ENG 365: Control of Human Limbs and Their Artificial Replacements

Tech L160

Tues, Thur 8:00-9:30 am

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**Required Textbook:** Shurr DG and Michael JW (2002). *Prosthetics and Orthotics* (2nd Ed.). Upper Saddle River, NJ: Prentice-Hall. [ISBN 0-8385-8133-1]

This text was chosen to enable the student to be aware of practical problems in prosthetics and orthotics as seen by practitioners in clinical practice.

**Other Resources:** The text will be supplemented by reading references, handouts, videos and lecture/demonstrations.

**Course Overview:** This course considers normal human movement (especially grasping, reaching, walking, and running); pathological conditions resulting from disease, injury, malformations, birth, etc.; and engineering approaches such as prostheses (limb replacements) and orthoses (limb assists) that may be able to ameliorate the conditions and promote normal movement and function. In doing so, we will also touch on musculoskeletal anatomy, comparative anatomy, muscle mechanics, and neural control. An objective of the course is to try to bring together technical analysis and synthesis skills of students with the practical problems of persons disabled by amputation, stroke, spinal cord injury, and other causes. The potential problems of applying engineering techniques to human beings will be emphasized. Engineering design compromises that are necessary are also given emphasis.

### Grading:

Assigned Problems:	10%
Midterm Exam:	25%
Final Exam:	25%
Oral Presentation:	20%
Term Paper:	20%

**NOTE:** Class attendance and participation will also be considered when determining the final grade.

### Tentative Lecture Schedule:

<i>Date</i>	<i>Topic</i>	<i>Reading</i>
January 3-7	Introduction / Hand prostheses & comparative anatomy	Chapter 1
January 10-14	Hand function, musculoskeletal anatomy of the hand and arm, non-hand-like prehensors, myoelectricity	Chapter 2
January 17-21	Transradial, transhumeral and shoulder disarticulation prostheses	Chapter 7
January 24-28	<b>Midterm</b>	
January 31	History of engineering in rehabilitation (Dr. Dudley Childress) /	
- February 6	Lower limb anatomy	
February 7-11	Normal human walking / Animal gaits	Chapter 3
February 14-18	Artificial feet; transtibial, transfemoral and hip disarticulation prostheses	Chapters 4-6
February 21-25	Pathological gait and aided walking (crutches, canes and walkers)	
February 28	Orthoses	Chapters 8-11
- March 4		
March 7-11	<b>Student presentations</b>	
March 14-18	<b>Final Exam Week:</b> Final scheduled for 3-5pm, March 16 <sup>th</sup>	