Sports Medicine: Performance and Fatigue
Summer Session I, Summer 2016
Refer to syllabus for class times
Locations: DIS, N7-C24 and Training facilities
Elite Fysioterapi, Vesterbrogade 15A

Instructor
Martin Prassé
M.Sc. Exercise & Fitness (University of Southern Denmark 2009), B.Sc. Physiotherapy (2005),
Strength and conditioning coach and physiotherapist for DAFF (Danish American Football
Federation), DBU (Danish Soccer Association) and DCF (Danish Cricket Federation). Has a
private practice where he works with sports injury rehabilitation and sports specific training
of athletes. With DIS since 2014.

DIS Contacts
Lisbeth Borbye, Program Director
Stephanie Clemente, Project Manager,
Kristen Andersen, Program Assistant,
Cameron Matticks, Program Assistant,
Science & Health Office: Vestergade 10-B12

Prerequisites
At least one year of biology and one year of chemistry at university level.
One semester of physiology is highly suggested to assist students in this course.

Course Description
The course covers a general introduction to anatomy, kinesiology and the biomechanics of human
movement. The student will be introduced to analyses of movement in regards to dysfunctions that will
increase risk of injury. The effects of fatigue will be discussed and students will be introduced to training
schemes to decrease injury risk.
Throughout the course there will be case studies where students will have to apply their knowledge of
biomechanics and anatomy to determine the most efficient and effective treatments and recoveries in
different scenarios. Students will be exposed to such skills as immediate decision-making, consultation,
injury evaluation and communication.

NOTE: There will be a physical component to this course where the students will be expected to run and lift
weights.

Objectives
The objective of the course is to introduce students to sports medicine through a mechanistic
approach which can later be applied in a clinical setting. Upon completion of this course, students
should be able to:
1. Understand the biomechanics during the human movement
2. Make a quick screening of movement to determine increased risk of injury
3. Gain a general overview of the most reoccurring muscle injuries and why they happen on a molecular level
4. Introduction to kinesiology lab skills
5. Make a basic exercise regime to prevent injury
6. Perform basic first aid in an on-field setting

Approach to teaching
The course will be taught with a dynamic hands-on approach where the students are expected to participate in an interactive way. Clinical and lab tests will be applied on students by students and instructors.

Not all literature for each lecture will be covered in class. However it will serve as a foundation for the discussions in class.

In order to excel in this course you should have a basic understanding and feel comfortable with anatomy and concepts that are typically covered in an introductory anatomy course.

Evaluation
Students will be evaluated based on participation, one exam, two assignments and a final project.

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<tbody>
<tr>
<td>Exam</td>
<td>20%</td>
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<tr>
<td>Assignments (2 at 15% each)</td>
<td>30%</td>
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<tr>
<td>Final Project</td>
<td>40%</td>
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<tr>
<td>Participation</td>
<td>10%</td>
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Class participation covers the following areas:
- Attendance
- Level of preparation and ability to answer questions asked in class
- Involvement in class and group discussions

Exam:
The Exam length will be for 60 minutes.
You will be examined on all reading and lecture material from the first week of classes.
Tests will consist of a mix of short answer questions and essay questions regarding anatomy in relation to the major joints in the body and regarding exercise physiology.

Assignment I, due Wednesday June 1 for class:
For Assignment I, you will produce a corrective exercise prescription for a client.
You will be divided into groups of two.
You will work together in these groups during May 31 and perform screening tests upon each other. Based upon your findings in the screening you will provide three corrective exercises in total for each individual in the group.
You will deliver a written description of the exercises no later than 8.00 am on June 1.
Written exercise description should include:

- Illustrations on how to perform it
- Purpose of the exercises
- Written description on how to perform the exercise
- Volume of the exercise (time, reps, sets, frequency)
- A short discussion of why these exercises are chosen over others.

You will be graded individually.

Assignment II - TBD

Final Project, due Friday June 10

As the final project you will present a full case report. This report should function as a complete and structured exercise-program. It will build upon the assignments you completed during the course. The project should include:

- Case description (1-2 pages)
  - The injury incident
  - Type of injury
  - Sport and anticipated return-level
  - Findings
    - Dysfunctional movement patterns (as in Assignment I)
    - Physiological needs e.g. lack of strength, anaerobe capacity.
      - Focus on factors directly as well as indirectly linked to the injury. Do not limit findings only to specific injury

- Exercise-program (max 3 pages)
  - create complete program which counts in findings, physiological needs and challenges in relations to injury
  - Must include: Corrective exercises, strength training, relevant cardio training and neuromuscular training.
    - The exercise program has to be realistic (will my case-person be able to complete).

- Include a short discussion of why these exercises are chosen over others, with reference to scientific literature. (max 1 page)

- A short discussion on sleep and nutrition in regards to the athlete. (max 1 page)

- List of references.

The final project will be graded on correlation between findings, exercise program and functionality in regards to the athletes needs in the case. Must include references to the scientific literature used in the project. The final project will be graded individually.

Work load

This is an intensive course, and in three weeks you will receive three credits. In order to merit this you should expect a high work load. We have designed the course so that you will have on average 3-4 hours of classes every teaching day and sometimes more. You should expect to use on average 2-3 hours preparing for each day of classes.
Electronics
Computer and cell phone usage is not allowed in class. It is distracting to both your classmates and your instructors, so please keep them off and out of sight during class!

Policy on late assignments:
Late assignments will be accepted, but your grade for the paper will be reduced by half a letter grade for each day that it is late.

Disability resources:
Any student who has a need for disability accommodations should contact Sean Green to coordinate this. Upon DIS approval, students should inform the instructor of accommodations within the first two days of class.

Academic Honesty:
DIS expects that students abide by the highest standards of intellectual honesty in all academic work. DIS assumes that all students do their own work and credit all work or thought taken from others. Academic dishonesty will result in a final course grade of “F” and can result in dismissal. The students’ home universities will be notified. DIS reserves the right to request that written student assignments be turned in electronic form for submission to plagiarism detection software. See the Academic Handbook for more information, or ask your instructor if you have questions.

Classroom etiquette
Laptops in class: You may use your laptop for note-taking or fact-checking. Usage not related to the class or our subject is unacceptable. We will rely on your integrity and your respect for our objectives. If you are using your laptop for reasons not related to class, your class participation grade will be reduced significantly and you will be asked not to bring your laptop.
A good learning environment requires as little disturbance as possible, and that everyone is present, prepared, and participating. Out of respect for both faculty and fellow students we expect you to be ready when the class starts and to participate in the full duration of the class without leaving the class room. Rest room visits and other errands are to be completed before and after class.

Canvas
Canvas is a web-based system that allows you to access course resources and communicate with your classmates and faculty. To access the Canvas, you can go to the DIS homepage and click the ‘DIS Canvas’ link, or go to: disabroad.instructure.com/ You can also download the Canvas App (By: Instructure) on iPhone and Android mobile smart phones.
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<thead>
<tr>
<th>Date</th>
<th>Topic(s)</th>
<th>Literature</th>
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<tbody>
<tr>
<td>Wed, May 25</td>
<td>Please Pick up textbooks before class</td>
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<tr>
<td></td>
<td>Textbook Pick up, 9:00 – 20:00 in DIS Library, Vestergade 10A - second floor</td>
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<tr>
<td>14:00 -15:00</td>
<td>Introduction to Course</td>
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<td>DIS, N7-C24</td>
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<td>15:00-16:00</td>
<td>Pre-disposing Factors for Sports Injury</td>
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<td>DIS, N7-C24</td>
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<td>Thur, May 26</td>
<td>Anatomy</td>
<td>Hole:</td>
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<tr>
<td>10:00-12:00</td>
<td>Muscle and joint anatomy</td>
<td>1.7 Anatomical terminology; relative position + body sections</td>
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<tr>
<td>DIS, N7-C24</td>
<td>• Hands-on Activity: Tendon/muscle/joint examination lower body</td>
<td>7.7 – 7.12 pp 147-161 bones</td>
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<tr>
<td>13:00-15:00</td>
<td>Muscle and joint anatomy</td>
<td>7.13 pp 161-172 Joint types</td>
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<td>DIS, N7-C24</td>
<td>• Hands-on Activity: Tendon/muscle/joint examination upper body</td>
<td>8.7 pp190-192</td>
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<td>8.8; pp 195-205</td>
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<td>Muscle that moves: pectoral girdle, the arm, the forearm, the abdominal wall, the thigh, the leg, the foot,</td>
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<td>Fri, May 27</td>
<td>Physiology I</td>
<td>McArdle et al: Ch. 7, pp 161-176 + fig. 11.2</td>
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<tr>
<td>09:30-11:30</td>
<td>Energy Transfer</td>
<td>McArdle et al: Ch 21; pp 461-491</td>
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<tr>
<td>Idrætshuset Østerbro</td>
<td>Aerobic/Anaerobic Exercise</td>
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<td>Adaptations and tissue response at different intensities, including acute and chronic variables</td>
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<td></td>
<td>Physiology II</td>
<td>Hole:</td>
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<tr>
<td>13:00-15:00</td>
<td>Motor units and their function</td>
<td>Ch. 8 (8.1-8.6) pp176-190</td>
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<tr>
<td>FitnessDK, Nygårdsvej</td>
<td>Strength training</td>
<td>McArdle et al: Ch 22; pp 502-506, 509-516, 520-522, 528-535</td>
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<td>Adaptations and tissue response at different intensities, including acute and chronic variables</td>
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<td>Mon, May 30</td>
<td>Exam:</td>
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<tr>
<td>10:00-11:00</td>
<td>Anatomy + Physiology</td>
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<td>DIS, N7-C24</td>
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<tr>
<td>Date</td>
<td>Time</td>
<td>Location</td>
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| Tues, May 31 | 9:00-12:00 | DIS, N7-C24 | Introduction to Assignment I Basic Kinesiology  
• Screening of Movement, lower body  
• Dysfunctional movements effect on the kinetic chain  
• The effect of fatigue on the kinetic chain  

|         |       |          | Journals (Compendium):  

Proximal and distal contributions to lower extremity injury: a review of the literature. Chuter VH, Janse de Jonge XA.  

Journals (Compendium):  
Alterations in shoulder kinematics and associated muscle activity in people with symptoms of shoulder impingement. Ludewig PM, Cook TM. |
|------------|-------|----------|---------------------------------------------------------------------------|-----------|
| 13:00-16:00 | DIS, N7-C24 | Basic Kinesiology  
• Screening of Movement, upper body  
• Dysfunctional movements effect on kinetic chain  
• The effect of fatigue on the kinetic chain |
| Wed, Jun 1 | 10:00-12:00 | DIS, N7-C24 | Assignment I Due:  
Training  
• Rehab  
• Mobility/Stability  
• Optimization of movement  

Running technique  
• How to run efficiently without injury  
Assistance by:  
Anne Møller  
Physiotherapist,  
10x Danish Champion, 100 m hurdle |
| 13:30-15:30 | Elite Fysioterapi, outdoor | | N/A  
Upload your Exercise on Canvas by 8:00 am |
| Thur, Jun 2 | 10:00-12:00 | Elite Fysioterapi | Biomechanics  
• How does the body respond to different running styles?  
• Gait analyses using force platform software.  
Assistance by:  
Jakob Mogensen Versterre,  
Physiotherapist, Osteopath D.O.  

• Anthropometry and biomechanics in regards to squat, deadlift, press |
| 13:00-15:00 | Elite Fysioterapi | | (Compendium):  
Hoppenfeld  
Ch 5, pp 133-142  

Journals (Compendium):  

Can the RSscan footscan® D3DTM orthotic reduce lower limb injury in an initial Military training setting  
Franklyn-Miller A, Boyington W |
### Fri, June 3  
14.00-15.30  
DIS, N7-C24

**Guest Lecture:**  
Adam Witten  
*Injuries; when to operate and when to treat conservatively*

### Week III

| Mon, June 6  
9:00-12:00  
DIS, N7-C24 |
|-----------------------------------|
| **Walk/Run to Fælledparken**  
**Lunch**  
13:30-15:00  
Fælledparken |

#### Injuries I
- Overuse vs. Overload  
- What is inflammation?  
  Differences in acute and chronic inflammation  
- Use of NSAIDS in connection with training and competition

#### Injuries II
- Acute damage assessment and treatment  
  Head injury/concussions  
- Immediate treatment of acute musculo-skeletal injuries  
  RICEM (rest, ice, compression, elevation, mobilization)

| Tues, June 7  
9.00-11.00  
DIS, N7-C24 |
|-----------------------------------|
| **Recovery**  
Diet/supplement  
Sleep |

**Textbook:**  
Hole; ch 6.5 p125, pp136-137

**Journals (Compendium):**  

*What role do NSAIDs have in the sports medicine setting*  
Windt DW; Dansk Sportsmedicin 2013 nr.3

**Journals (Compendium):**  
*Onfield assessment of concussion in the adult athlete.* Putukian M, Raftery M, Guskiewicz K, Herring S, Aubry M, Cantu RC, Molloy M.

**Will use in class:**  
[http://bjsm.bmj.com/content/47/5/259.full.pdf](http://bjsm.bmj.com/content/47/5/259.full.pdf)

**Journals (Compendium):**  
*Progressive dehydration causes a progressive decline in basketball skill performance.* Baker LB, Dougherty KA, Chow M, Kenney WL.


*Sleep in Elite Athletes and Nutritional Interventions to Enhance Sleep.* Halson SL

**Journals (PDF):**  
*Guidelines for fluid replacement during marathon running.* Noakes T
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<tr>
<th>Date</th>
<th>Time</th>
<th>Activity</th>
<th>Location</th>
<th>Notes</th>
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<tr>
<td>Tues, June 7</td>
<td>13.00-15.00</td>
<td><strong>Connie Linnebjerg</strong>&lt;br&gt;Physiotherapist, Team Danmark&lt;br&gt;Idrættens hus, Brøndby stadion 20, 2605 Brøndby</td>
<td>DIS</td>
<td>Meet course assistant at DIS, Vesteregade 7 courtyard at <strong>12.00 sharp</strong> to depart for field study</td>
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<td>Wed, June 8</td>
<td>10:00-12:00</td>
<td><strong>Training</strong>&lt;br&gt;• Fiber damage&lt;br&gt;• Tendon injuries&lt;br&gt;• Joint injuries&lt;br&gt;Assistance by: Kristoffer Holmstrup, Physiotherapist.</td>
<td>DIS, Idrættens hus</td>
<td>Journals (<strong>Compendium</strong>):&lt;br&gt;Corticosteroid injections, eccentric decline squat training and heavy slow resistance training in patellar tendinopathy. Kongsgaard M&lt;br&gt; Muscle Strength and Functional Performance in Patients With Anterior Cruciate Ligament Injury Treated With Training and Surgical Reconstruction or Training Only: A Two to Five-Year Followup. Eva, Ageberg&lt;br&gt;Knee kinematics and kinetics in former soccer players with a 16-year-old ACL injury – the effects of twelve weeks of knee-specific training. Anette von Porat, Marketta Henriksson, Eva Holmström and Ewa M Roos&lt;br&gt;Acute hamstring injuries in Swedish elite sprinters and jumpers: a prospective randomised controlled clinical trial comparing two rehabilitation protocols. Askling CM, Tengvar M, Tarassova O, Thorstensson A.&lt;br&gt;The Preventive Effect of the Nordic Hamstring Exercise on Hamstring Injuries in Amateur Soccer Players: A Randomized Controlled Trial. Van der Horst N, Smits DW, Petersen J, Goedhart EA, Backx FJ.</td>
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<td>Thurs, June 9</td>
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<td>Consultations (optional) *more to be discussed a few days before Reserved for Makeup class</td>
<td>DIS</td>
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<td>Fri, June 10</td>
<td>9:00-12:00</td>
<td><strong>Final Project DUE</strong></td>
<td>DIS, N7-C24</td>
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<td><strong>Course Wrap-up</strong>&lt;br&gt;‘Dream Topic’</td>
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