<table>
<tr><td colspan="2">Module designation</td><td colspan="5">Pharmacology and Doping</td></tr>
<tr><td colspan="2">Semester(s) in which the module is taught</td><td colspan="5">4</td></tr>
<tr><td colspan="2">Person responsible for the module</td><td colspan="5">dr. Mutmainnah B, M.Kes., SpKJ</td></tr>
<tr><td colspan="2">Language</td><td colspan="5">Bilingual (Bahasa and English)</td></tr>
<tr><td colspan="2">Relation to curriculum</td><td colspan="5">Compulsory</td></tr>
<tr><td colspan="2">Teaching methods</td><td colspan="5">3 parallel classes consist of 35 students/class:
1) Lecture (Face to face lecture): 2 hours x 14 weeks
2) Practical class: -</td></tr>
<tr><td rowspan="5">Workload</td><td>Total workload</td><td colspan="5">88 hours</td></tr>
<tr><td></td><td>Face to face teaching</td><td>Structured activities</td><td>Independent study</td><td>Exam</td><td>total</td></tr>
<tr><td>Lecture</td><td>28</td><td>28</td><td>28</td><td>4</td><td>88</td></tr>
<tr><td>Practical class</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td colspan="3"></td><td></td><td>88</td></tr>
<tr><td colspan="2">Credit points</td><td colspan="5">2 credits</td></tr>
<tr><td colspan="2">Required and recommended prerequisites for joining the module</td><td colspan="5">None</td></tr>
<tr><td colspan="2">Module objectives / intended learning outcomes</td><td colspan="5">After completing the course students will:
1. understand the history of doping and supplementation in sports.
2. demonstrate and understanding of optimal experimental design for studies examining the effectiveness of various drugs and supplements used by athletes.
3. understand the extent of doping and supplementation at various levels of competition and by various age groups.
4. understand the process of absorption, distribution, metabolism, and elimination of pharmacological compounds.
5. understand the use of drugs for athletes and its relation to anti-doping regulations.
6. understand about WADA's prohibition list, therapeutic use exceptions and Indonesia's drug search database, and how to use this knowledge to advise athletes on</td></tr>
</table>

	the correct use of drugs. 7. demonstrate an understanding of drug testing, including the methods used and the legal issues involved. 8. understand the potential benefits and risks of various drugs and supplements, and the use of this knowledge to conduct risk assessment, and prevention of doping in both sport and society. 9. become familiar with the scientific literature regarding various drugs and supplements used by athletes.
Content	• Definition of doping, supplementation, and ergogenic aids. • History of doping in sport. • Determining the efficacy of performance-enhancing substances. • Pharmacokinetics and pharmacodynamics. • Anabolic/androgenic steroids and prohormones. • β2-Agonists (use as a bronchodilator to enhance exercise performance, use to enhance muscle force and power production, effects of longer-term use on body composition). • Growth hormone and growth hormone releasers. • Blood doping and recombinant erythropoietin. • Caffeine (effects on very high intensity, short-term exercise, effects on high intensity exercise of moderate duration, effects on endurance performance). • Creatine (effects on anaerobic exercise performance, effects on muscle mass). • Amphetamines and central nervous system stimulants (Bromantan, Mesocarb). • β-Adrenergic Antagonists • Drug-receptor interactions and pharmacodynamics • Drug formulation and quality assurance in drug production • Control of doping and illicit substances

Exams and assessment formats	**Assignments** • **Homework Assignment**: Each student search and summarize scientific articles in the last 5 years on pharmacology and exercise doping. • **Group presentation**: Students will work in groups (3 to 4 students each group) in order to prepare and present a 15-minute talk. Each group will choose a supplement that is beneficial for a certain group of athletes. Students will discuss the benefits of this supplement would have and how its effects are brought about. Also, discuss dosage and usage patterns and the potential side effects of the supplement that students have selected. Their grade on presentation will depend upon scientific reasoning, the evidence that student provide that supports the effectiveness of the supplement, and effectiveness of the presentation. **Weight**: 50% **Mid and Final Examinations** **Intent**: The exam is held twice, namely the mid-semester exam and the end-semester exam. Exams can include multiple choice, multiple answer, multiple choice, fill-in-the-blank, and essay. Each exam will count equally towards the final grade. **Weight**: 50%
Study and examination requirements	Students are expected to attend all classes unless circumstances prevent them from attending and an email was sent prior to class. Final grading will be based on students' attendance, their participation in completing the assignments, and their scores in mid and final examinations.
Reading list	Antonio J. & Stout J.R. (2002). Supplements for endurance athletes. Human Kinetics. Haff, G. G. (2008). Essentials of sports nutrition study guide. Humana Press. Müller, R. K. (2010). Doping in Sports: Biochemical Principles, Effects and Analysis. Springer.