

# **Module Overview**

of the Master's Program in  
Exercise Science & Sports Nutrition

## Mandatory Modules of the Master's Program in Exercise Science & Sports Nutrition

### Applied Anatomy and Biomechanics in Sport (10 Credit Points)

- Molecular basics of adaptation processes
- Basics of cellular mechanotransduction
- Anatomy and mechanics of the muscle
- Structural properties and composition of connective tissue
- Adaptation processes of the muscle through physical activity
- Influence of physical activity on bones, cartilage, tendons, ligaments, and fasciae
- Interference between endurance and strength training adaptations

**Test Performance:** Exam (90 Minutes)

### Practical Sports Nutrition (5 Credit Points)

- Body composition diagnostics
- Calculation of the basal metabolic rate
- Measurement of the individual and sport-related energy demand
- Nutritional diagnostics
- Food science
- Special dietary needs
- Nutrition management based on practical examples

**Test Performance:** Oral Examination (20 Minutes)

**Organ Systems (10 Credit Points)**

- Structure of the human organism
- Basics of digestion
- Structure and function of the human digestive system
- Structure and function of the liver, kidney, gallbladder, thyroid, and pancreas
- Structure and function of the urinary and immune systems

**Test Performance:** Exam (120 Minutes)

**Testing and Training Strength, Speed, Agility, and Quickness (5 Credit Points)**

- Performance diagnostics and test procedures
- Basics of sports biology
- Biomechanics
- Training methods and exercise prescription
- Training examples and programs

**Test Performance:** Exam (90 Minutes), Practical Examination (20 Minutes)

**Exercise Physiology and Training Adaptations (10 Credit Points)**

- The importance of the endocrine system during physical activity
- Influence of genetic and epigenetic factors on adaptation processes
- Adaptive reactions of the nervous system to training
- Acute reactions and adaptations of the cardiovascular system
- Adaptations to strength and endurance training

**Test Performance:** Exam (90 Minutes)

**Testing and Training Flexibility and Endurance (5 Credit Points)**

- Performance diagnostics and test procedures
- Basics of sports biology
- Biomechanics
- Training methods and exercise prescription
- Training examples and programs

**Test Performance:** Exam (90 Minutes)

**Bioenergetics of Training and Exercise (10 Credit Points)**

- Basics of biology and biochemistry
- Catalytic and regulatory strategies
- Biosynthesis of different molecules
- Metabolism: concepts and basic patterns
- Carbohydrate, fat, and protein metabolism and training adaptations
- Influence of sports and nutrition on the coordination of metabolism

**Test Performance:** Exam (120 Minutes)

**Designing Training Programs (5 Credit Points)**

- Periodization
- Temporal and content-related levels of the training plan
- Development of a training plan (multiannual plan or long-term plan, annual plan, macro and mesocycle plan, weekly training plan, training sessions plan)
- Overtraining
- „Peaking“, „Tapering“, „Detraining“
- Concurrent training
- Training planning based on practical examples

**Test Performance:** Oral Examination (30 Minutes)

**Nutrition Strategies and Plans (5 Credit Points)**

- Planning and development of nutrition strategies in competitive sports
- Influence of nutrition on adjustment processes
- Anamnesis and analysis
- Nutrition counseling for elite athletes
- Interdisciplinary mentoring and development of nutrition strategies

**Test Performance:** Oral Examination (30 Minutes)

**Exercise, Nutrition, and Special Dietary Needs for Different Target Groups (10 Credit Points)**

- Importance and manifestations
- Training and nutrition depending on different age groups
- Training and nutrition depending on gender
- Sports and nutrition during pregnancy
- Disabled sports
- Training and nutrition with adiposity
- Sports and nutrition with diverse diseases (e.g., rheumatism, Hashimoto's, diabetes)
- Target group-specific training and nutrition planning, monitoring, and consultation based on a practical example

**Test Performance:** Oral Examination (60 Minutes)

**Management of Recovery in Sport (5 Credit Points)**

- The importance of recovery management in sports
- Sports-biological basics of fatigue and recovery
- Assessment of fatigue
- Monitoring training and performance in athletes
- Recovery strategies and their effectiveness
- Recovery and nutrition
- Individualization of recovery management based on practical examples

**Test Performance:** Exam (90 Minutes)

**Sports Psychology for Coaches (5 Credit Points)**

- Basics of sports psychology
- Relaxation and activation techniques
- Target setting methods
- Imagination methods
- Attention regulation
- Conversation techniques
- Consulting methods
- Heart rate variability and mental training

**Test Performance:** Term Paper

**Research Project (5 Credit Points)**

- Scientific training and research methods
- Data collection, data management, and data analysis
- Preparation of a scientific paper

**Test Performance:** Project Report, Presentation (30 Minutes)

**Colloquium on the Master Thesis (5 Credit Points)**

- Consultation on basic problems in creating a Master Thesis
- Literature research
- Presentation and discussion of the Master Thesis at different development stages
- Preparation of an exposé
- Discussion of research results and transfer to other fields of application
- Scientific training research methods
- Formulation of research hypotheses
- Preparation of a scientific paper

**Test Performance:** Presentation of the Topic and the Progress of the Master Thesis

**Master Thesis (10 Credit Points)**

- Independent processing of a research question using scientific research methods within a given period

**Test Performance:** Master Thesis



## Optional Compulsory Modules of the Master's Program in Exercise Science & Sports Nutrition

### Strength Training and Conditioning for Children and Adolescents (5 Credit Points)

- Importance and fields of application
- Basics of sports biology
- Personal development
- Recommendations for training in childhood and adolescence
- Talent promotion in young competitive sports

**Test Performance:** Exam (90 Minutes)

### Sports Injuries and Rehabilitation (5 Credit Points)

- Risk management
- Legal aspects
- Pain diagnostics and healing processes
- Therapy
- Return to sport/activity/play/competition

**Test Performance:** Term Paper

### Nutrition Supplements (5 Credit Points)

- Differences between food supplements, novel food, and medications
- Doping and food supplements
- Substance classes and mechanisms
- Systematic literature research on food supplements
- Consultation and application in different target groups

**Test Performance:** Oral Examination (30 Minutes)

**Modern Diets (5 Credit Points)**

- Examples of modern diets
- Resource-saving diets
- Superfoods
- Bio initiatives
- Individualized nutrition through genetic analysis
- Innovative meat substitutes
- The impact of media-makers and influencers on diets
- Nutrition 4.0: diets and globalization

**Test Performance:** Exam (90 Minutes)