



LITHUANIAN SPORTS UNIVERSITY

STUDY MODULE PROGRAMME (SMP)

| | | | | | | | | | | | |
|-------------|-------------------|-----|--------|-------------|------------------|------|----|----|--------------|--|--|
| Module Code | B | 580 | M | 003 | Accredited until | 2014 | 06 | 30 | Renewal date | | |
| | Branch of Science | | Progr. | Registr. №. | | | | | | | |

Entitlement

Skeletal Muscles and Motor Control

Prerequisites

Course (module) Learning Outcomes

| №. | Learning Outcomes | Teaching / Learning Methods | Assessment Methods |
|----|-------------------|---|------------------------|
| 1 | | Group work, Problem-based learning, Scientific paper analysis | Essay |
| 2 | | Practical exercises (tasks) | Laboratory examination |

Main aim

Based on fundamental and applied sciences achievements provide students with knowledge and skills : a) to examine and analyse muscle adaptation phenomena ; b) to study and analyse the motor control mechanisms

Level of module

| Level of programme | | Subject group (under the regulation of the area) | Subject level |
|--------------------|--------|--|---------------|
| Cycle | Type | | |
| Second | Master | Bendrojo universitetinio lavinimo | Deepening |

Group under financial classification

Syllabus

| №. | Sections and themes | Responsible lecturer |
|-----|--|---------------------------------------|
| 1. | Genetic and Signal Transduction Aspects of Strength Training | 459 prof. Aivaras Ratkevičius |
| 2. | Skeletal muscle: form and function | 52 prof. habil.dr. Albertas Skurvydas |
| 3. | Mechanisms of muscle contraction and relaxation | 52 prof. habil.dr. Albertas Skurvydas |
| 4. | Neural control of muscle force | 52 prof. habil.dr. Albertas Skurvydas |
| 5. | Phenomenon's of muscular and neural adaptation to training | 52 prof. habil.dr. Albertas Skurvydas |
| 6. | Neuromuscular fatigue | 52 prof. habil.dr. Albertas Skurvydas |
| 7. | Muscle damage | 111 prof. Sigitas Kamandulis |
| 8. | The mechanisms of muscle hypertrophy and atrophy | 347 doc. dr. Nerijus Masiulis |
| 9. | The mechanisms of strength training | 347 doc. dr. Nerijus Masiulis |
| 10. | The mechanisms of power and velocity training | 347 doc. dr. Nerijus Masiulis |
| 11. | Skeletal muscle in an age perspective | 347 doc. dr. Nerijus Masiulis |
| 12. | Models for motor control | 52 prof. habil.dr. Albertas Skurvydas |
| 13. | Motor control: diferent research methods | 195 doc. dr. Dalia Mickevičienė |

References

| №. | Title |
|----|--|
| 1. | Skurvydas A. Judesių mokslas: raumenys, valdymas, mokymas, reabilitavimas, sveikatinimas, treniravimas, metodologija // Kaunas, LKKA, 2011. |
| 2. | Latash, M.L. Neurophysiological Basis of Movement // Champaign, Illinois: Human Kinetics, 2008. |
| 3. | Enoka, R. Neuromechanics of Human Movement // Champaign, Illinois: Human Kinetics, 2008. |
| 4. | Stergiou, N. Innovative Analyses of Human Movement. – Champaign, Illinois: Human Kinetics, 2004. |
| 5. | Franklin, D.W., Wolpert, D.M. Computational mechanisms of sensorimotor control // Neuron. 2011, 3:72(3):425-42. IF:14.9. |
| 6. | Schiaffino S., Reggiani C. Fiber types in mammalian skeletal muscles // Physiol Rev. 2011; 91(4):1447-531. IF: 28. |
| 7. | Nishikawa, K., Biewener, A.A., Aerts, P., Ahn, A.N. et al. Neuromechanics : an integrative approach for understanding motor control // Integrative and Comparative Biology, 2007, 47 (1): 16-54. IF:2.6. |

| №. | Title |
|-----|--|
| 8. | Roger N. Lemon. Descending Pathways in Motor Control // Annual Review of // Neuroscience, 2008, Vol. 31, 195-218. IF: 26.7. |
| 9. | Braun T, Gautel M. Transcriptional mechanisms regulating skeletal muscle differentiation, growth and homeostasis // Nat Rev Mol Cell Biol. 2011, 12(6):349-61. IF: 38.6. |
| 10. | Timmons J.A. Variability in training-induced skeletal muscle adaptation // J Appl Physiol. 2011, 110(3):846-53. IF: 4. |

Additional literature

| №. | Title |
|----|---|
| 1. | Lang T, Streeper T, Cawthon P, Baldwin K, Taaffe DR, Harris TB. Sarcopenia: etiology, clinical consequences, intervention, and assessment // Osteoporos Int. 2010, 21(4):543-59. IF: 4.9. |
| 2. | Westerblad H, Bruton JD, Katz A. Skeletal muscle: energy metabolism, fiber types, fatigue and adaptability // Exp Cell Res. 2010, 1;316(18):3093-9. IF: 3.7. |
| 3. | Allen DG, Lamb GD, Westerblad H. Skeletal muscle fatigue: cellular mechanisms // Physiol Rev. 2008, 88(1):287-332. IF: 16. |
| 4. | Ranatunga KW, Roots H, Pinniger GJ, Offer GW. Crossbridge and non-crossbridge contributions to force in shortening and lengthening muscle // Adv Exp Med Biol. 2010;682:207-21. IF: 1.5 |
| 5. | Rome LC. Design and function of superfast muscles: new insights into the physiology of skeletal muscle // Annu Rev Physiol. 2006;68:193-221. IF: 37.7. |
| 6. | MacIntosh BR, Shahi MR. A peripheral governor regulates muscle contraction // Appl Physiol Nutr Metab. 2011;36(1):1-11. IF: 2.3. |
| 7. | Taylor JL, Gandevia SC. A comparison of central aspects of fatigue in submaximal and maximal voluntary contractions // J Appl Physiol. 2008; 104(2):542-50. IF: 4. |
| 8. | Morelli V. Fatigue and chronic fatigue in the elderly: definitions, diagnoses, and treatments // Clin Geriatr Med. 2011, 27(4):673-86. IF: 1.7. |
| 9. | Langdon DW. Cognition in multiple sclerosis // Curr Opin Neurol. 2011, 24(3):244-9. IF: 5.4. |

Coordinating lecturer

| Position | Degree, surname, name | Schedule №. |
|--------------------|-----------------------------------|-------------|
| Research Assistant | Assoc. Prof. Dr. Nerijus Masiulis | 347 |

Subdivision

| Entitlement | Code |
|-------------|------|
| a | 2006 |

Study module teaching form №. 1

| Semester | Mode of studies | Structure | | | | Total hours | Credits | |
|----------|-----------------|-----------|--------|------|-----------|-------------|---------|----|
| | | Lectures | Pract. | Lab. | Ind. work | | | |
| A | S | D | 13 | 13 | 0 | 234 | 260 | 10 |

Languages of instruction:

| | | | | | | | | | | | |
|------------|---|---------|---|---------|---|--------|---|--------|---|-------|------|
| Lithuanian | L | English | E | Russian | R | French | F | German | G | Other | Oth. |
|------------|---|---------|---|---------|---|--------|---|--------|---|-------|------|

Plan of in-class hours

| №. of Themes | Academic hours | | | №. of Themes | Academic hours | | |
|--------------|----------------|---|---|--------------|----------------|----|---|
| | Lectures | P | L | | Lectures | P | L |
| 1. | 1 | 1 | 0 | 9. | 1 | 1 | 0 |
| 2. | 1 | 1 | 1 | 10. | 1 | 1 | 0 |
| 3. | 1 | 1 | 0 | 11. | 1 | 1 | 1 |
| 4. | 1 | 1 | 1 | 12. | 1 | 1 | 1 |
| 5. | 0 | 1 | 0 | 13. | 1 | 1 | 0 |
| 6. | 1 | 1 | 1 | 14. | 1 | 1 | 0 |
| 7. | 1 | 1 | 0 | 15. | 1 | 1 | 1 |
| 8. | 1 | 0 | 1 | 16. | 1 | 1 | 2 |
| Total: | | | | | 15 | 15 | 9 |

