

**UNIVERSITY OF THESSALY**

**MSc Course “PSYCHOLOGY OF EXERCISE”**

**INFORMATION ABOUT THE MODULE**

1. **TITLE OF MODULE:** Motor learning, Physical activity and health
2. **CODE OF MODULE:**
3. **MAIN LECTURER:** Zisi Vasiliki e-mail: vzisi@pe.uth.gr
4. **OTHER LECTURERS:** Polatou Elizana, Hatzitaki Vassilia, Jamurtas Athanasios
5. **MODE OF TEACHING/CONDUCT:** Twelve 3-hour meetings, either workshops or seminars or labs
6. **IDENTIFICATION OF MODULE:** Module of the 2<sup>nd</sup> semester

**Key-words:**

Motor learning, motor behavior, motor control, physical activity, psychobiology.

**7. AIM OF THE MODULE**

Students will acquire the necessary knowledge and competencies that will enable them to explain motor behaviour on most aspects of human performance and physical activity. At the end of the course they will be able to apply effectively their knowledge to promote motor learning and motor performance in sport, leisure and everyday activities, contributing thus in the promotion of health related fitness.

**8. LEARNING OUTCOMES**

At the end of this module students should:

- Ñ know fundamental considerations of the field of psychobiology and understand the role of physical activity and movement to the biological functions of the human body, which are linked to fundamental psychological functions and mechanisms,
- Ñ understand fundamental principles of motor control and the sensory contributions to human performance,
- Ñ understand and explain in great part the large diversity in human performance,
- Ñ know how to design and apply appropriate measures in the research of motor learning and motor performance,
- Ñ understand the fundamental principles and mechanisms involved in perception and human information processing,
- Ñ understand the learning process and recognise variables that facilitate – hinder learning,
- Ñ design effective practice sessions to facilitate learning.

**9. TEACHING METHODS**

Workshops, seminars, labs

**10. TIMETABLE & PLANNING**

/	Lecturer	Topic
1	Zisi Vasiliki	Psychobiology of physical activity: Brain and cognitive function.
2	Jamurtas Athanasios	Psychobiology of physical activity: Emotions, pain and substance abuse.
3	Zisi Vasiliki	Individual differences and capabilities.
4	Zisi Vasiliki	Research methods on motor learning and motor behavior.
5	Hatzitaki Vassilia	Sensory and motor contributions to motor control.
6	Zisi Vasiliki	Human information processing. <b>Lab:</b> Reaction Time.

7	Zisi Vasiliki	Attention and performance. <b>Lab:</b> Continuous Attention.
8	Zisi Vasiliki	The learning process.
9	Polatou Elizana	Augmented feedback. <b>Lab:</b> Knowledge of results / performance curves
10	Polatou Elizana	Conditions of practice. <b>Lab:</b> Mass – distributed practice / performance curves
11	Polatou Elizana	<b>Workshop:</b> Facilitating learning and performance.
12	Zisi Vasiliki	<b>Seminar:</b> Current trends on measuring motor learning and performance.

### 11. EVALUATION:

- 1 Essay 20%
- 1 pro-seminar 30%
- Presentational and communication skills 10%
- Final exams (40%)

### 11. SUGGESTED HANDBOOKS

- Acevedo, E.O., & Ekekakis, P. (2006). *Psychobiology of physical activity*. Champaign, IL: Human Kinetics.
- Schmidt, R.A., & Lee, T.D. (2005). *Motor control and learning: A behavioral emphasis* (4<sup>th</sup> ed.). Champaign IL: Human Kinetics.
- Schmidt, R.A., & Wrisberg, C.A. (2004). *Motor Learning and Performance: A problem based learning approach* (3<sup>rd</sup> ed). Champaign IL: Human Kinetics.

## OUTLINE

### Lecture 1

Title	Content	Key-words
Psychobiology of physical activity: An introduction	Introduction to the area of psychobiology. Main research themes in this area. Research findings regarding the relationship between physical activity and brain function and between physical activity and cognitive function.	Psychobiology, brain, neuroimaging, cognition
<b>Readings</b>	<p>Acevedo, E.O., &amp; Ekekakis, P. (2006). Psychobiology of physical activity: Integration at last! In E.O. Acevedo and P. Ekekakis (Eds.), <i>Psychobiology of physical activity</i> (pp. 1 – 14). Champaign, IL: Human Kinetics.</p> <p>Williamson, J. W. (2006). Brain activation during physical activity. In E.O. Acevedo and P. Ekekakis (Eds.), <i>Psychobiology of physical activity</i> (pp. 29 – 42). Champaign, IL: Human Kinetics.</p> <p>Etnier, J.L., Salazar, W., Landers, D.M., Petruzzello, S.J., Han, M., Nowell, P. (1997). The influence of physical fitness and exercise upon cognitive functioning: A meta-analysis. <i>Journal of Sport and Exercise Psychology</i>, 19, 249-277.</p>	

**Lecture 2**

Title	Content	Key-words
Psychobiology of physical activity: Emotions, pain and substance abuse	Physical activity and pain. Physical activity and emotion. Affective responses to acute exercise. Dose-Response model. Alcohol use and abuse.	Exercise, exertion, mood, dose-response model.
<b>Readings</b>	<ul style="list-style-type: none"> <li>▪ Cabanac, M. (2006). Exertion and pleasure from an evolutionary perspective. In E.O. Acevedo and P. Ekekakis (Eds.), <i>Psychobiology of physical activity</i> (pp. 79 – 90). Champaign, IL: Human Kinetics.</li> <li>▪ Ekekakis, P. &amp; Acevedo, E.O. (2006). Affective responses to acute exercise: Toward a psychobiological dose – response model. In E.O. Acevedo and P. Ekekakis (Eds.), <i>Psychobiology of physical activity</i> (pp. 91 – 110). Champaign, IL: Human Kinetics.</li> <li>▪ Cook, D.B. (2006). Physical activity and pain. In E.O. Acevedo and P. Ekekakis (Eds.), <i>Psychobiology of physical activity</i> (pp. 203 – 218). Champaign, IL: Human Kinetics.</li> <li>▪ Ussher, M., Sampuran, A.K., Doshi, R., West, R., Drummond, D.C. (2004). Acute effect of a brief bout of exercise on alcohol urges. <i>Addiction</i>, 99, 1542–1547.</li> <li>▪ Gianoulakis, Ch. (2004). Endogenous opioids and addiction to alcohol and other drugs of abuse. <i>Current Topics in Medicinal Chemistry</i>, 43, 000 – 000.</li> </ul>	

**Lecture 3**

Title	Content	Key-words
Sensory contributions to motor control.	Closed loop control systems. Vision. Audition. Proprioception. Open loop processes. Central control mechanisms. Motor program Issues	Motor control, motor program, closed loop, open-loop, sensory information.
<b>Readings</b>	<ul style="list-style-type: none"> <li>• Schmidt, R.A., &amp; Lee, T.D. (2005). <i>Motor control and learning: A behavioral emphasis</i> (4<sup>th</sup> ed.). Champaign IL: Human Kinetics (pp. 125 – 206).</li> <li>• Schmidt, R.A., &amp; Wrisberg, C.A. (2004). <i>Motor Learning and Performance: A problem based learning approach</i> (3<sup>rd</sup> ed). Champaign IL: Human Kinetics (pp. 91 – 154).</li> <li>• Hatzitaki, V., Zisi, V., Kollias, I. &amp; Kioumourtzoglou, . (2002). Perceptual-Motor Contributions to Static and Dynamic Balance Control in Children. <i>Journal of Motor Behavior</i>, 34, 161-170.</li> <li>• Yiou, E. &amp; Do, M.C. (2001) In a complex sequential movement, what component of the motor program is improved with intensive practice, sequence timing or ensemble motor learning? <i>Experimental Brain Research</i>, 137, 197-204.</li> </ul>	

**Lecture 4**

Title	Content	Key-words
Individual differences and capabilities.	Fundamental considerations in motor skills issues. Concept of individual differences. Abilities. Taxonomies. Prediction.	Motor abilities, capabilities, motor skills' classification system, open - closed skills.
<b>Readings</b>	<ul style="list-style-type: none"> <li>• Schmidt, R.A., &amp; Lee, T.D. (2005). <i>Motor control and learning: A behavioral emphasis</i> (4<sup>th</sup> ed.). Champaign IL: Human Kinetics (pp. 271 – 300).</li> <li>• Schmidt, R.A., &amp; Wrisberg, C.A. (2004). <i>Motor Learning and Performance: A problem based learning approach</i> (3<sup>rd</sup> ed). Champaign IL: Human Kinetics (pp. 3 – 50).</li> <li>• Zisi, V., Deri, V. &amp; Hatzitaki, V. (2003). The role of perceptual and motor abilities in instep kicking performance of young soccer players. <i>Perceptual &amp; Motor Skills</i>, 96, 625-636.</li> <li>• Kioumourtzoglou, E., Michalopoulou, M., Tzetzis, G. &amp; Kourtesis, T. (2000). Ability profile of the elite volleyball player. <i>Perceptual and Motor Skills</i>, 90, 757-770.</li> </ul>	

**Lecture 5**

Title	Content	Key-words
Research methods on motor learning and motor behavior.	Basing considerations in measurement. Measuring motor behavior. Measuring motor learning. Learning and performance variables. Experimental designs on learning.	Learning curves, variable error, constant error, absolute error, accuracy
<b>Readings</b>	<ul style="list-style-type: none"> <li>• Schmidt, R.A., &amp; Lee, T.D. (2005). <i>Motor control and learning: A behavioral emphasis</i> (4<sup>th</sup> ed.). Champaign IL: Human Kinetics (pp. 22 – 51 &amp; 301 - 320).</li> <li>• Emanuel, M., Jarus, T., &amp; Bart, O. (2008). Effect of focus of attention and age on motor acquisition, retention, and transfer: A randomized trial. <i>Physical Therapy</i>, 88, 251 – 260.</li> <li>• Wolpert, D.M., Ghahramani, Z. &amp; Flanagan, R.J. (2001) Perspectives and problems in motor learning. <i>TRENDS in Cognitive Sciences</i>, 5, 487-494.</li> </ul>	

**Lecture 6**

Title	Content	Key-words
Human information processing. <b>Lab:</b> Reaction Time.	The information – processing model. Anticipation. Signal detection theory. Reaction time and decision making. Memory systems.	Information processing, response selection, stimulus- response compatibility. Short term memory.
<b>Readings</b>	<ul style="list-style-type: none"> <li>• Schmidt, R.A., &amp; Lee, T.D. (2005). <i>Motor control and learning: A behavioral emphasis</i> (4<sup>th</sup> ed.). Champaign IL: Human Kinetics (pp. 52 – 88).</li> <li>• Schmidt, R.A., &amp; Wrisberg, C.A. (2004). <i>Motor Learning and Performance: A problem based learning approach</i> (3<sup>rd</sup> ed). Champaign IL: Human Kinetics (pp. 53 – 67 &amp; 84 - 90).</li> <li>• Simonen, R.L., Videman, T., Battie, M.C., &amp; Gibbons, L.E. (1998). The effect of lifelong exercise on psychomotor reaction: a study of 38 pairs of male monozygotic twins. <i>Medicine and Science in Sport and Exercise</i>, 30, 1445-1450.</li> <li>• Tun, P.A., &amp; Lachman, M.E..(2008). Age differences in reaction time and attention in a national telephone sample of adults: education, sex, and task complexity matter. <i>Developmental psychology</i>, 44, 1421 – 1429.</li> </ul>	

**Lecture 7**

Title	Content	Key-words
Attention and performance. <b>Lab:</b> Continuous Attention.	Types of attention. Theories of attention. Attention and interference during movement. Cell phones, attention and driving. Attention and arousal.	Arousal, stress, anticipation, psychological refractory period, Stroop effect, attention allocation
<b>Readings</b>	<ul style="list-style-type: none"> <li>• Schmidt, R.A., &amp; Lee, T.D. (2005). <i>Motor control and learning: A behavioral emphasis</i> (4<sup>th</sup> ed.). Champaign IL: Human Kinetics (pp. 89 – 122).</li> <li>• Schmidt, R.A., &amp; Wrisberg, C.A. (2004). <i>Motor Learning and Performance: A problem based learning approach</i> (3<sup>rd</sup> ed). Champaign IL: Human Kinetics (pp. 68 –84).</li> <li>• Williams, A. M., Davids, K., Burwitz, L., &amp; Williams, J. G. (1994). Visual search strategies in experienced and inexperienced soccer players. <i>Research Quarterly for Exercise and Sport</i>, 65, 127-135.</li> <li>• Wulf, G. (2008). Attentional focus effects in balance acrobats. <i>Research Quarterly for Exercise and Sport</i>, 79, 319-325.</li> </ul>	

**Lecture 8**

Title	Content	Key-words
The learning process.	Theories of motor learning. Characteristics of the learning process. The learner. Retention and motor memory. Retention loss. Transfer of learning.	Learning assessment. Schema theory. Closed-loop theory.
<b>Readings</b>	<ul style="list-style-type: none"> <li>• Schmidt, R.A., &amp; Lee, T.D. (2005). <i>Motor control and learning: A behavioral emphasis</i> (4<sup>th</sup> ed.). Champaign IL: Human Kinetics (pp. 401 – 459).</li> <li>• Schmidt, R.A., &amp; Wrisberg, C.A. (2004). <i>Motor Learning and Performance: A problem based learning approach</i> (3<sup>rd</sup> ed). Champaign IL: Human Kinetics (pp. 185 – 245).</li> <li>• Shea, C.H., &amp; Wulf, G. (2005). Schema theory: a critical appraisal and reevaluation. <i>Journal of Motor Behavior</i>, 37, 85 – 101.</li> <li>• Whitacre, C.A., &amp; Shea, C.H. (2000). Performance and learning of generalized motor programs: relative (GMP) and absolute (parameter) errors. <i>Journal of Motor Behavior</i>, 32, 163 – 175.</li> </ul>	

**Lecture 9**

Title	Content	Key-words
Augmented feedback. <b>Lab:</b> Knowledge of results	Augmented feedback. Knowledge of performance. Knowledge of results. Theoretical issues on augmented feedback functions.	Video feedback, Kinematic feedback, Biofeedback.
<b>Readings</b>	<ul style="list-style-type: none"> <li>• Schmidt, R.A., &amp; Lee, T.D. (2005). <i>Motor control and learning: A behavioral emphasis</i> (4<sup>th</sup> ed.). Champaign IL: Human Kinetics (pp. 364 – 400).</li> <li>• Schmidt, R.A., &amp; Wrisberg, C.A. (2004). <i>Motor Learning and Performance: A problem based learning approach</i> (3<sup>rd</sup> ed). Champaign IL: Human Kinetics (pp. 275 – 309).</li> <li>• van Dijk, H., Mulder, T., &amp; Hermens, H.J. (2007). Effects of age and content of augmented feedback on learning an isometric force-production task. <i>Experimental Aging Research</i>, 33, 341 – 353.</li> <li>• Hurley, S.R., &amp; Lee, T.D. (2006). The influence of augmented feedback and prior learning on the acquisition of a new bimanual coordination pattern. <i>Human Movement Science</i>, 25, 339 – 348.</li> </ul>	

**Lecture 10**

Title		Content	Key-words
Conditions of practice. <b>Lab:</b> Mass – distributed practice		The power law of practice. Prepractice considerations. Distribution of practice. Variability of practice. Part versus whole practice.	Verbal information, modeling, mass-distributed practice, part-whole practice, contextual interference.
<b>Readings</b>	<ul style="list-style-type: none"> <li>• Schmidt, R.A., &amp; Lee, T.D. (2005). <i>Motor control and learning: A behavioral emphasis</i> (4<sup>th</sup> ed.). Champaign IL: Human Kinetics (pp. 321 – 363).</li> <li>• Schmidt, R.A., &amp; Wrisberg, C.A. (2004). <i>Motor Learning and Performance: A problem based learning approach</i> (3<sup>rd</sup> ed). Champaign IL: Human Kinetics (pp. 247 – 273).</li> <li>• Mackrout, I., &amp; Proteau, L. (2007). Specificity of practice results from differences in movement planning strategies. <i>Experimental Brain Research</i>, 183, 181 – 193.</li> <li>• Wright, D.L. &amp; Shea, C.H. (2001). Manipulating generalized motor program difficulty during blocked and random practice does not affect parameter learning. <i>Research Quarterly for Exercise and Sport</i>, 72, 32-38.</li> </ul>		

**Lecture 11**

Title		Content	Key-words
<b>Workshop:</b> Facilitating learning and performance		Integration and applications of principles of skill learning and skilful performance using case studies as examples.	Practice conditions, learning, performance assessment, diagnosing, designing.
<b>Readings</b>	<ul style="list-style-type: none"> <li>▪ Schmidt, R.A., &amp; Wrisberg, C.A. (2004). <i>Motor Learning and Performance: A problem based learning approach</i>. Champaign IL: Human Kinetics.(pp. 311 – 350).</li> </ul>		

**Lecture 12**

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<b>Seminar:</b> Current trends on motor learning and performance.		Presentations of Master students' small-scale projects.	
<b>Readings</b>			