대학원 강 의 계 획 서

2011년 2학기 기계공학과

교 과 목		**인체동역학** (2106460701)		학 점	3
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교과목 개요 및 목표		생체역학(Biomechanics)의 한 부분으로서, 인체의 운동과 힘의 관계를 다룸. 보행 중 근골격계의 운동을 분석하고, 관절 및 근육에 관련된 운동역학을 뉴튼 법칙에 근거하여 체계적으로 학습함.			
수업진행방법		강의, 토의, 사례 발표.			
평가방법		시험(50점 = 25점×2회), 과제(25점, 6회), 발표(15점 = 5점×3회), 출석(10점: 시간당 결석 -1점, 지각/조퇴 -0.3점)			
교재	주교재	D. A. Winter, Biomechanics and Motor Control of Human Movement, 4th ed., Wiley, 2009.			
	강의노트	http://jokim.kr → 강의과목 → 인체동역학 → 예습자료			
	참고자료	김경 등 72인 공역, 근골격계의 기능해부 및 운동학, 정담미디어, 2004 (D. A. Neumann, Kinesiology of the Musculoskeletal System, Mosby, 2002).			

강 좌 의 개 요

주	강의 내용	세부 내용	일정
1	0. Dynamics 1. Biomechanics	0.1 dynamics 1.1 measurement, description, analysis, etc. 1.2 biomechanics, physiology, anatomy 1.3 scope of the textbook	9. 6
2	(no class)	추석 연휴	9.13
3	2. Signal Processing	2.0 introduction 2.1 auto- and cross-correlation analses 2.2 frequency analysis 2.3 ensemble averaging of repetitive waveforms	9.20
4	3. Kinematics (1)	3.0 historical development 3.1 kinematic conventions 3.2 direct measurement techniques 3.3 imaging measurement techniques	9.27
5	3. Kinematics (2)	3.4 processing of raw kinematic data 3.5 calculation of other kinematic variables HW1	10. 4

주	강의 내용	세부 내용	일정
6	4. Anthropometry	4.0 scope 4.1 density, mass, inertial properties 4.2 direct experimental measures 4.3 muscle anthropometry HW2	10.11
7	5. Kinetics : Forces and Moments	5.0 biomechanical models 5.1 basic link-segment equations 5.2 force transducers and force plates 5.3 bone-on-bone forces HW3	10.18
8	Midterm Exam.	Chapters 1~5	10.25
9	6. Mechanical Work, Energy, and Power (1)	6.0 introduction 6.1 efficiency	11. 1
10	6. Mechanical Work, Energy, and Power (2)	6.2 forms of energy storage 6.3 calculation of internal and external work 6.4 power balances HW4	11. 8
11	7. Three-Dimensional Kinematics and Kinetics	7.1 axes systems 7.2 marker and anatomical axes systems 7.2.1 example of a kinematic data set 7.3 segment angular velocity and acceleration 7.4 kinetics of reaction forces and moments HW5	11.15
12	8. Synthesis of Human Movement	8.0 introduction 8.1 forward solution models 8.2 mathematical formulation 8.3 system energy 8.4 external forces and torques 8.5 designation of joints 8.6 illustrative example HW6	11.22
13	9. Muscle Mechanics	9.0 introduction 9.1 force-length characteristics of muscles 9.2 force-velocity characteristics 9.3 muscle modeling	11.29
14	10. Kinesiology Electromyography	10.1 electrophysiology of muscle contraction 10.2 recording of the electromyogram 10.3 processing of the electromyogram 10.4 EMG and biomechanical variables	12. 6
15	11. Biomechanical Movement Synergies	11.1 support movement synergy 11.2 medial/lateral & anterior/posterior balance 11.3 dynamic balance during walking	12.13
16	Final Exam.	Chapters 6~11	12.20