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國立東華大學

教學計劃表　Syllabus

課程名稱(中文) Course Name in Chinese	運動生物力學專題研究			學年/學期 Academic Year/Semester	114/1
課程名稱(英文) Course Name in English	Advanced Sports Biomechanics				
科目代碼 Course Code	PE__50300	系級 Department & Year	碩士	開課單位 Course-Offering Department	體育與運動科學系
修別 Type	選修 Elective	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/王令儀				
先修課程 Prerequisite					

課程描述　Course Description

1. 運動生物力學進階知識建構
2. 動力學逆過程的力學機制與運算並撰寫程式
3. 關節肌肉力矩、功率與做功的肌動學概念
4. 運動生物力學實驗操作實務

課程目標　Course Objectives

1. 了解運動生物力學之定義與範疇。
2. 了解運動生物力學研究之現況與趨勢。
3. 學習運動生物力學之理論與在人體運動中之運用。
4. 學習運動生物力學研究。

	系專業能力 Basic Learning Outcomes	課程目標與系專業能力相關性 Correlation between Course Objectives and Dept.’s Education Objectives
A	具備專業領域之學術研究能力。To possess academic research capabilities in specialized fields.	●
B	具備學術知能及實務研究之能力。To possess both academic knowledge and practical research capabilities.	●
C	具備體育運動研究發展之能力。To possess the capability for research and development in physical education and sports.	
D	具備體育本土化及國際化之視野。To possess a localized and globalized perspective in physical education.	○

圖示說明Illustration ：● 高度相關 Highly correlated ○中度相關 Moderately correlated

授 課 進 度 表 Teaching Schedule & Content

週次Week	內容 Subject/Topics	備註Remarks
1	課程說明與報告分組 Winter課本	
2	分組講授課本內容＋教師補充 1 Biomechanics as an Interdiscipline 1 1.0 Introduction, 1 1.1 Measurement, Description, Analysis, and Assessment, 2 1.1.1 Measurement, Description, and Monitoring, 3 1.1.2 Analysis, 5 1.1.3 Assessment and Interpretation, 6 114國科會實驗說明與預備實驗1	

3	分組講授課本內容＋教師補充 1.2 Biomechanics and its Relationship with Physiology and Anatomy, 7 1.3 Scope of the Textbook, 9 1.3.1 Signal Processing, 9 1.3.2 Kinematics, 10 1.3.3 Kinetics, 10 1.3.4 Anthropometry, 11 1.3.5 Muscle and Joint Biomechanics, 11 1.3.6 Electromyography, 11 1.3.7 Synthesis of Human Movement, 12 1.3.8 Biomechanical Motor Synergies, 12 114國科會實驗說明與預備實驗2	
4	分組講授課本內容＋教師補充 3 Kinematics 45 3.0 Historical Development and Complexity of Problem, 45 3.1 Kinematic Conventions, 46 3.1.1 Absolute Spatial Reference System, 46 3.1.2 Total Description of a Body Segment in Space, 47 3.3 Imaging Measurement Techniques, 53 3.3.3 Cinematography, 55 3.3.4 Television, 58 3.3.5 Optoelectric Techniques, 61 3.3.6 Advantages and Disadvantages of Optical Systems, 63 3.3.7 Summary of Various Kinematic Systems, 64 MegaSpeed+AMTI同步收CMJ（動力學逆過程實驗模組） TA： 辜＋1位儲備人才	
5	分組講授課本內容＋教師補充 3.4.5 Comparison of Some Smoothing Techniques, 74 3.5 Calculation of Other Kinematic Variables, 75 3.5.1 Limb-Segment Angles, 75 3.5.2 Joint Angles, 77 3.5.3 Velocities—Linear and Angular, 77 3.5.4 Accelerations—Linear and Angular, 78 Kwon3D比例板設定、資料處理與座標轉換	
6	分組講授課本內容＋教師補充 5 Kinetics: Forces and Moments of Force 5.0 Biomechanical Models, 107 5.0.1 Link-Segment Model Development, 108 5.0.2 Forces Acting on the Link-Segment Model, 109 5.0.3 Joint Reaction Forces and Bone-on-Bone Forces, 110 6 Mechanical Work, Energy, and Power 6.0 Introduction, 139 Kwon3D設定與點光點	
7	動力學逆過程介紹與紙筆撰寫運算式	
8	動力學逆過程Excel撰寫運算式	
9	動力學逆過程Kwon3D數值輸入Excel運算式並解讀	
10	校慶運動會停課一天 11/15 TSBS高師大	
11	動力學逆過程Excel繪製M, P曲線並計算W及解讀	
12	運動營養講座	
13	運動心理講座	
14	運動科技講座	
15	114國科會實驗參與	
16	114國科會實驗參與	

17	114國科會實驗參與	
18	114國科會實驗參與	

教 學 策 略 Teaching Strategies

- [x] 課堂講授 Lecture
- [x] 分組討論Group Discussion
- [ ] 參觀實習 Field Trip
- [ ] 其他Miscellaneous:

教 學 創 新 自 評 Teaching Self-Evaluation

創新教學(Innovative Teaching)

- [x] 問題導向學習(PBL)
- [x] 團體合作學習(TBL)
- [x] 解決導向學習(SBL)
- [ ] 翻轉教室 Flipped Classroom
- [ ] 磨課師 Moocs

社會責任(Social Responsibility)

- [ ] 在地實踐Community Practice
- [ ] 產學合作 Industy-Academia Cooperation

跨域合作(Transdisciplinary Projects)

- [ ] 跨界教學Transdisciplinary Teaching
- [ ] 跨院系教學Inter-collegiate Teaching
- [ ] 業師合授 Courses Co-taught with Industry Practitioners

其它 other:

學期成績計算及多元評量方式 Grading & Assessments									
配分項目 Items	配分比例 Percentage	多元評量方式 Assessments							
		測驗 會考	實作 觀察	口頭 發表	專題 研究	創作 展演	卷宗 評量	證照 檢定	其他
平時成績(含出缺席) General Performance (Attendance Record)									
期中考成績 Midterm Exam									
期末考成績 Final Exam									
作業成績 Homework and/or Assignments									
其他 Miscellaneous (_____)									

評量方式補充說明
Grading & Assessments Supplemental instructions

1. 出席率與上課態度影響學期總分
2. 課堂報告：50%
3. 課程進度成果報告：50%

教科書與參考書目（書名、作者、書局、代理商、說明）
Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.)

Winter, D. A. (2005). Biomechanics and motor control of human movement (3th ed.). New York: John Wiley & Sons.

課程教材網址(含線上教學資訊,教師個人網址請列位於本校內之網址)
Teaching Aids & Teacher's Website(Including online teaching information. Personal website can be listed here.)

其他補充說明 (Supplemental instructions)

課程依實際教學進度做彈性調整。