	Ministry of Higher Education and Scientific Research - Iraq Al-Nahrain University College of Science Physics Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	BIOMECHANICS			**Module Delivery**	
Module Type	CORE			☒**Theory** ☐**Lecture** ☒**Lab** ☒**Tutorial** ☒**Practical** ☒**Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level	1		**Semester of Delivery**	2	
Administering Department	Medical physics		**College**	College of Science	
Module Leader	Dr. Ibrahim Karim Abbas		**e-mail**	Ibrahim.karim@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Lecturer Doctor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Review Committee Approval			**Version Number**		

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	2
Co-requisites module	None	**Semester**	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	**1. Define the terms *biomechanics, statics, dynamics, kinematics,* and *kinetics,* and explain the ways in which they are related.** **2. Describe the scope of scientific inquiry addressed by biomechanics.** **3. Distinguish between qualitative and quantitative approaches for analyzing human movement, and explain how to formulate questions for qualitative analysis of human movement.**		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**On completion of this module, students are expected to be able to:** **1. Explain the actions of forces and moments and the concept of equilibrium in biomechanics.** **2. Discuss tensile and compressive loading and the associated linear stress-strain relationship in biomechanics.** **3. Discuss the kinematics of simple translation and rotational biomechanical systems, kinetics of rigid bodies and apply the concepts of work, power and energy.** **4. Explain the effects of friction, mass moment of inertia and the dynamics of simple systems in biomechanics.**		
Indicative Contents المحتويات الإرشادية			
Learning and Teaching Strategies استراتيجيات التعلم والتعليم			
Strategies	**The learning strategy depends on the following:** **1- Feeding the student with theoretical foundations and concepts from theoretical lectures.** **2- Daily and semester tests.** **3- Assigning students to solve the required mathematical problems and discussing them during the class.**		

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	15% (15)	5, 8	LO #1, LO#2
	Seminar	7	10% (5)	2, 4.7	LO # 3, 4
	Projects / Lab.	10	30% (15)	Continuous	LO#, 1, 2 AND 3
	Tutorials	7	5% (5)	-	
Summative assessment	**Midterm Exam**	3 hr	10% (10)	8	LO#1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to Biomechanics**
Week 2	**Static Forces and Equilibrium**
Week 3	**Mechanical Properties of Bone**
Week 4	**Human Levers and Linkage Systems**
Week 5	**Kinematics of Human Movement**
Week 6	**Applications in Biomechanics**
Week 7	**Force Analysis, Friction, and Equilibrium in Biomechanics**
Week 8	**Mid-term exam**
Week 9	**Bio-Fluid Mechanics I: Hemodynamics**
Week 10	**Bio-Fluid Mechanics II: Respiratory Physics**
Week 11	**Work, Power, and Energy Expenditure**
Week 12	**Tutorials and applications in biomechanics**
Week 13	**Physics of Pressure in Biological Systems**

Week 14	**Tutorials and applications in biomechanics**
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Instructions to students, Basic personal needs and other requirements. Writing the account of an experiment, Introduction to graphical representation of experimental data, Errors, their determination and minimization, least square fitting. Units.
Week 2	Lab 2: Force Table
Week 3	Lab 3: Boyle's Law
Week 4	Lab 4: Tension experiment
Week 5	Lab 5: Inclined Plane
Week 6	Lab 6: Free Fall
Week 7	Lab 7: Newton Laws
Week 8	Lab 8: Momentum inertia experiment
Week 9	Lab 9: Arduino Sensors and its applications in Biomechanics
Week 10	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		Available
Recommended Texts	**Biomechanics of Sport and Exercise Third Edition, 2013 Peter M. McGinnis State University of New York, College at Cortland**	Available
	Fundamentals of Biomechanics Duane Knudson Third Edition, Springer 2021	Available
Websites	**https://z-lib.id/**	

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

