BIOMECHANICS, B.S.

Biomechanics is the analysis of human movement to enhance performance, improve training, accelerate rehabilitation, and reduce injury risk. This is done by integrating various mechanical aspects of human movement during static and dynamic activities. The Biomechanics degree applies physics and math principles to study the interactions between humans and various machine systems in both working and living environments. Students will be exposed to specialized equipment to help measure the interaction of humans with their environment. Force plates and accelerometers measure forces generated by various segments of the body and then exerted externally to the body. Muscle activation is measured through electromyography. Motion analysis, using video to create three-dimensional reconstructions, measures body positions, velocities, and accelerations.

The degree in Biomechanics provides students with the background and skills needed to create work and living environments which improve human health and enhance performance. This is a fast growing healthcare related field that is undergoing an increasing demand for this type of specialization. Biomechanical scientists are found in a wide variety of settings, including research and development, universities, sports performance centers, industrial and commercial settings, sports medicine clinics, hospitals, private practice, and the military.

Admission

Admission Criteria

Prospective students must meet the minimum criteria listed below to be considered for admission to the program:

- Admission to Marshall University;
- An overall cumulative minimum GPA of 2.75 to continue in the degree program beyond the sophomore year;
- A *C* or better in all required coursework;
- Declared Biomechanics as a major, including preferred area of emphasis if applicable.

- General Education Course

- Milestone course: a key success marker for your major. See your advisor to discuss the importance of this course in your plan of study.

The Core Curriculum is designed to foster critical thinking skills and introduce students to basic domains of thinking that transcend disciplines. The Core applies to all majors. Information on specific classes in the Core can be found at https://www.marshall.edu/gened/.

Course Requirements

Code	Title	Credit Hours
Core Curriculum		
Core 1: Critical Thinking		
FYS 100	First Yr Sem Critical Thinking	3
HS 200	Comp Medical Terminology (CT)	3
PSY 201	Introductory Psychology (CT)	3
Core 2		
ENG 101	Beginning Composition	3
ENG 201	Advanced Composition	3
CMM 103	Fund Speech-Communication	3
MTH 132	Precalculus with Sci Applica	5
BSC 228	Human Physiology	4
BSC 228L	Human Physiology Lab	1
Core II Humanities (WI)		3
PSY 201	Introductory Psychology (CT)	3
Core II Fine Arts		3
MUS 142	Music in Society (recommended)	
Additional University Requirements		
Writing Intensive (WI Sec of Core II Hum)		3
Writing Intensive		3
Multicultural or International		
MUS 142	Music in Society (recommended)	
HS 475	Trends in Biomechanics (Capstone I)	3
HS 495	Trends in Biomechanics II (Capstone II)	3
Major-Specific		
BSC 227	Human Anatomy	4
BSC 227L	Human Anatomy Lab	1
BSC 228	Human Physiology	4
BSC 228L	Human Physiology Lab	1
DTS 210	Nutrition	3
ESS 220	Fitness and Wellness	3
ESS 345	Exercise Physiology	3
ESS 375	Fitness Assess & Exerc Prescr	3
STHM 401	Ethics in Sport	3
STHM 410	Leadership: Theory & Practice	3
ESS 442	Princ of Strength & Cond	3
ESS 443	Prin of Strength Cond Lab	1
HS 200	Comp Medical Terminology (CT)	3
HS 215	Intro to Athletic Training	3
HS 220	Personal Health	3
HS 222	Hlth Prov First Aid/CPR/AED	3
HS 365	Functional Kinesiology	3
HS 369	Motor Learning	3
HS 435	Biomech Instrument Mat Lab	3
HS 464	Pathomechanics	3
HS 465	Biomechanical Analy of Mvmt	3
HS 475	Trends in Biomechanics (C)	3
HS 495	Trends in Biomechanics II (C)	3
STA 225	Introductory Statistics (CT)	3
SFT 235	Intro to Occup Safety (CT)	3
SFT 373	Prin Ergonomics & Hum Factors	3
SFT 373L	Prin of Ergonomics Lab	1
PHY 201	College Physics I	3
PHY 202	General Physics I Laboratory	1
PHY 203	College Physics II	3
PHY 204	General Physics 2 Laboratory	1
PSY 311	Child Development	3
PSY 312	Adult Development	3

Free Elective (or Area of Emphasis)	3
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Free Elective	3

Major Information

- Students are required to know and track their degree requirements for graduation or for entrance to a professional school.
- Course offerings and course attributes are subject to change semesters. Please consult each semester's schedule of courses for availability and attributes.
- **Math Requirement:** The biomechanics math requirement is for MTH 132 Precalculus with Sci Applica only (a pre-requisite for Physics 1). Students need an ACT Math score of 24+ to be eligible for MTH 132 Precalculus with Sci Applica. For students with a lower ACT Math score, we allow them to take two courses as an alternative: Algebra (MTH 130 College Algebra with ACT 21+ or MTH 127 College Algebra-Expanded with ACT 17+) and then Trigonometry (MTH 122 Plane Trigonometry) over two semesters.

- General Education Course

- Milestone course: a key success marker for your major. See your advisor to discuss the importance of this course in your plan of study.

Semester Plan

Biomechanics is the analysis of human movement to enhance performance, improve training, accelerate rehabilitation, and reduce injury risk. This is done by integrating various mechanical aspects of human movement during static and dynamic activities. The Biomechanics degree applies physics and math principles to study the interactions between humans and various machine systems in both working and living environments. Students will be exposed to specialized equipment to help measure the interaction of humans with their environment. Force plates and accelerometers measure forces generated by various segments of the body and then exerted externally to the body. Muscle activation is measured through electromyography. Motion analysis, using video to create three-dimensional reconstructions, measures body positions, velocities, and accelerations.

First Year

First Semester		**Credit Hours**
FYS 100	First Yr Sem Critical Thinking	3
ENG 101	Beginning Composition	3
HS 200	Comp Medical Terminology (CT)	3
Select one of the following:		3-5
MTH 127	College Algebra-Expanded	
MTH 130	College Algebra	
MTH 132	Precalculus with Sci Applica	
UNI 100	Freshman First Class	1
	Credit Hours	**13-15**
Second Semester		
HS 222	Hlth Prov First Aid/CPR/AED	3
Select one of the following:		3
MTH 122	Plane Trigonometry	
Free Elective/Elective [1]		
ENG 201	Advanced Composition	3
BSC 227	Human Anatomy	4
BSC 227L	Human Anatomy Lab	1
PSY 201	Introductory Psychology (CT)	3
	Credit Hours	**17**

Second Year

First Semester

BSC 228	Human Physiology	4
BSC 228L	Human Physiology Lab	1
HS 365	Functional Kinesiology	3
PHY 201	College Physics I	3
PHY 202	General Physics I Laboratory	1
PSY 311	Child Development	3
HS 220	Personal Health	3
	Credit Hours	**18**

Second Semester

ESS 345	Exercise Physiology	3
PHY 203	College Physics II	3
PHY 204	General Physics 2 Laboratory	1
HS 215	Intro to Athletic Training	3
SFT 235	Intro to Occup Safety (CT)	3
PSY 312	Adult Development	3
	Credit Hours	**16**

Third Year

First Semester

ESS 375	Fitness Assess & Exerc Prescr	3
STHM 401	Ethics in Sport	3
HS 465	Biomechanical Analy of Mvmt	3
STA 225	Introductory Statistics (CT)	3
Core II Fine Arts		3
MUS 142	Music in Society (recommended)	
	Credit Hours	**15**

Second Semester

ESS 220	Fitness and Wellness	3
HS 435	Biomech Instrument Mat Lab	3
HS 464	Pathomechanics	3
SFT 373	Prin Ergonomics & Hum Factors	3
SFT 373L	Prin of Ergonomics Lab	1
Core II Humanities (WI)		3
	Credit Hours	**16**

Third Semester

Summer Term (required)		
HS 369	Motor Learning	3
	Credit Hours	**3**

Fourth Year

First Semester

DTS 210	Nutrition	3
ESS 442	Princ of Strength & Cond	3
ESS 443	Prin of Strength Cond Lab	1
HS 475	Trends in Biomechanics (C)	3
CMM 103	Fund Speech-Communication	3

Free Elective		3
	Credit Hours	**16**
Second Semester		
STHM 410	Leadership: Theory & Practice	3
HS 495	Trends in Biomechanics II (C)	3
Free Elective or Area of Emphasis		3
Free Elective or Area of Emphasis		3
	Credit Hours	**12**
	Total Credit Hours	**126-128**

[1] Free Elective if MTH 132 Precalculus with Sci Applica is completed in Fall

Areas of Emphasis

- Biomechanics Physics, Emphasis (http://catalog.marshall.edu/undergraduate/programs-az/health-professions/kinesiology/biomechanics-bs/biomechanics-physics-emphasis/)
- Biomechanics Pre-Medical, Emphasis (http://catalog.marshall.edu/undergraduate/programs-az/health-professions/kinesiology/biomechanics-bs/biomechanics-pre-medical-emphasis/)
- Biomechanics Pre-Physical Therapy, Emphasis (http://catalog.marshall.edu/undergraduate/programs-az/health-professions/kinesiology/biomechanics-bs/biomechanics-pre-physical-therapy-emphasis/)
- Biomechanics Safety, Emphasis (http://catalog.marshall.edu/undergraduate/programs-az/health-professions/kinesiology/biomechanics-bs/biomechanics-safety-emphasis/)