

# BIOMED E ERGONOMICS AND REHABILITATION ENGINEERING CONCENTRATION<sup>1</sup> - F07

MS: 30 total credit hours minimum

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## Rehabilitation Engineering/Ergonomics:

IOE 463 Measurement and Design of Work  
(3) (I,II)

## General:

BIOMED E 500 Biomedical Engineering Seminar  
(1) (I,II)<sup>2</sup>

BIOMED E 550 Ethics and Enterprise (1) (I)

## Research, Design, Internship (2 hours min):

BIOMED E 450 Biomedical Design  
(4) (II) (required for ergonomics  
focus)

BIOMED E 590 Directed Research (2) (I,II,III)

BIOMED E 599 - Section 001<sup>3</sup>  
Graduate BME Innovative  
Design Team (2) (I) **AND**

BIOMED E 599 - Sections 004 and 005<sup>3</sup>  
Graduate BME Innovative  
Design Team (4) (II)

Kinesiology 520 Sem Motor Control (3-6) (I)  
PM&R 539<sup>4</sup> Rehab. Eng. Clinical Internship  
(2-6) (I,II,III)

## Mathematics (one course):

IOE 510/Math 561 Linear Programming I (3) (I,II,IIIa)

Math 419 Linear Spaces and Matrix Theory  
(3) (I,II)

Math 450 Advanced Math for Engineers I  
(4) (I,II,IIIb)

Math 454 Boundary Value Problems for  
Partial Differential Equations  
(3) (I,II,IIIa)

Math 462<sup>5</sup> Mathematical Models (3)

Math 463 Math Modeling in Biology (3) (I)

Math 471 Introduction to Numerical  
Methods (3) (I,II,IIIb)

Math 556 Methods of Applied Math I (3) (I)

Math 557 Methods of Applied Math II (3)  
(II)

Math 571 Numerical Methods for Scientific  
Computing I (3) (I,II)

Math 572 Numerical Methods for Scientific  
Computing II (3) (II)

ME 501 Analytical Methods in Mechanics  
(3) (II)

ME 502 Methods of Differential Equations  
in Mechanics (3) (I)

## Bioinstrumentation (one course):

BIOMED E 458 Biomedical Instrumentation &  
Design (4) (I,II)

IOE 432 Industrial Engineering  
Instrumentation Methods (3) (IIIa)

## Statistics (one course):

Biostatistics 553 Applied Biostatistics (4) (I)  
EECS 501 Probability and Random Processes  
(4) (I,II)

IOE 465 Design and Analysis of  
Experiments (3) (II)

Statistics 470 Introduction to the Design of  
Experiments (4) (I)

Statistics 500 Applied Statistics I (3) (I)

Statistics 501 Applied Statistics II (3) (II)

## Life Science (one course):

BIOMED E 519 Quantitative Physiology (4) (I)

BIOMED E 599 Quant Analysis of Physiol Sys (3) (I)

PM&R 510 Disability and Rehabilitation Methods  
(3) (I)

## Technical Electives (two courses):

BIOMED E 456 Tissue Mechanics (3) (I)

BIOMED E 533/Kine 533

Neuromechanics (3) (I) - *for graduate  
students only*

BIOMED E 534 Occupational Biomechanics  
(3) (II)

BIOMED E 646/ME 646<sup>6</sup>

Mechanics of Human Movement (3)

EECS 493 User Interface Development (4) (II)

IOE 436 Human Factors in Computer Systems  
(3) (II)

IOE 533 Human Motor Behavior and  
Engineering Systems I (3) (I)

IOE 567 Work-Related Musculoskeletal  
Disorders (3) (II-alternate years)

ME 406 Biomechanics for Engineering  
Students (3) (II)

ME 567/EECS 567 Introduction to Robotics: Theory and  
Practice (3) (II)

Movesci 421 Disorders of Voluntary Movement (I  
or II, as arranged) (3)

Movesci 433/Kine 433

Human Movement & Aging:  
Functional Ability (3) (I or II)

Movesci 435 Biomechanics of Human Locomotion  
(3) (I) - *for undergraduate students  
only*

## Sample Course Sequence:

### Fall

BIOMED E 500 (1), BIOMED E 519  
(3), IOE 463 (3), BIOMED E 458 (3),  
BIOMED E 550 (1); elective

### Winter

IOE 436 (3), Math 450 (3); BIOMED  
E 534 (3); IOE 635(3); stats (3)

## BIOMED E ERGONOMICS AND REHAB ENG OPTION

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- <sup>1</sup> Students in the Ergonomics and Rehabilitation Engineering Option can apply for a two-year clinical internship, taken in conjunction with the Ergo/RE option, at the University of Michigan Medical Center. Students participating in the clinical internship are normally limited to less than 9 hours/term of formal class hours per term. The clinical internship involves considerable practicum and readings well beyond the credited course of study. Students who participate in the clinical internship should confer with Dr. Levine. Other students in this option should confer with Dr. Armstrong.
  - <sup>2</sup> I- fall, II - winter, III- spring-summer, IIIa - spring half, IIIb - summer half.
  - <sup>3</sup> In order for this course to count toward their degree in BME, students must register for this course in both the fall and winter terms, and they must adhere to the following rules:
    - a) this course can be counted as a SGUS, terminal MS, or MS/PhD student's 2 credit hour technical elective (fall term) and Biomedical Research and Design requirement (winter term),
    - b) this course, taken in both terms, can be counted as a technical elective for a student that has already taken BIOMED E 450 or BIOMED E 590,
    - c) this course can be counted as PhD coursework providing that it has not already been counted as the student's Biomedical Research and Design requirement or technical elective in their MS program, and the student's advisor approves.
  - <sup>4</sup> Only students accepted into the clinical internship are eligible to take PM&R 539. A minimum of 2 hours of Directed Research is required for any student proceeding on to the Ph.D.
  - <sup>5</sup> Refer to the Mathematics Department for current offering.
  - <sup>6</sup> Refer to the Mechanical Engineering Department for current offering.