



Campus:

2400 Bridgeway Boulevard, Suite 290
Sausalito, California 94965 USA

Postal Mailing Address:

PO Box 564
Mill Valley, California 94942 USA

Website: www.EnergyMedicineUniversity.org

Phone: 415-331-1011

Fax: 415-331-9293

Instructor Contact Information:

Location: Oakland, California, USA

Email: brubik@earthlink.net

Phone: 510-531-5767

Fax: 510-531-7224

Website: numerous by Google search

**EMP 843: The Science of Bioelectromagnetics and Its
Clinical Applications (3 Credits)**

Overview of Course:

This course is about bioelectromagnetics (BEM), the frontier science that deals with the effects of externally applied fields on living systems including humans. It involves the therapeutic effects of certain magnetic, electric, and electromagnetic fields associated with bioelectromagnetic medical devices and consumer health and wellness products. The paradigm clash between the bioelectromagnetics and the dominant biomedical paradigm will be discussed. The role of bioelectromagnetics in the future of medicine will also be covered.

Course Topics:

Overview on radiant fields of energy: magnetic, electric, and electromagnetic fields; the electromagnetic spectrum in relation to biology and medicine; a classical physics viewpoint of biological effects of electromagnetic fields; non-thermal non-ionizing effects of certain electromagnetic fields; differences between the paradigms of biomedicine and bioelectromagnetics; the role of static and dynamic magnetic fields in health and therapeutics; the role of pulsed electromagnetic fields in therapeutics; the major achievements of bioelectromagnetic medicine; consumer health products involving electromagnetic fields; the promise of bioelectromagnetic medicine in the future.

Learning Objectives:

1. Describe the nature of electromagnetic energy fields; describe the electromagnetic spectrum and its various frequency or energy bands and how these interact with life; describe magnetic fields and how these interact with life. Provide specific examples of each of these.
2. Explain how bioelectromagnetics is challenging to mainstream science and medicine. Describe the paradigmatic clash between them.
3. Describe at least 2 scientific theories of how bioelectromagnetic therapy may work.
4. Describe 3 FDA (US Food and Drug Administration)-approved medical devices that are bioelectromagnetic in nature, what they are used for, their status in medicine, and how they may work to promote healing.
5. Discuss the issues concerning the increasing number of “black box” treatment devices in the consumer health marketplace.
6. Describe some frontier research discoveries in bioelectromagnetics that remain challenging to our scientific and medical understanding.

Audience:

Open to all students in the Masters and Doctoral program.

COURSE DESCRIPTION

Bioelectromagnetics (BEM) is a frontier science that studies the interaction of externally applied electromagnetic (EM) fields with organisms, spanning from the lowest life form to humans. EM fields in medicine have a mixed history. On the one hand, there is a growing scientific literature documenting life-thwarting effects from power line frequencies (50-60 Hertz) as well as radiofrequencies used in the wireless world of communication. On the other hand, there is a small but growing medical literature showing therapeutic effects from certain extremely low-level EM fields, including regenerative wound healing, pain relief, and enhanced bone mending. In this course, we will examine only therapeutic effects from externally applied fields.

We will cover the science of the electromagnetic spectrum and magnetism in relation to life. We will discuss the paradigm clashes that exist between BEM and conventional biomedicine, and explore the key findings on BEM therapies, as well as discuss the increasing number of consumer health products that appear to be based on “field” principles, but are often not well documented.

In contrast to conventional EM medical devices, such as Magnetic Resonance Imaging (MRI) and defibrillators, BEM therapies typically operate at much lower energy levels and often in extremely low frequency ranges. BEM is more widely known and used outside of the U.S. A few of the most prominent BEM devices employed in the U.S. are the (1) TENS (transcutaneous electrical nerve stimulation) devices for pain control; (2) PEMF for non-union bone fractures; and (3) TCS (transcranial stimulators) or TMS (transcranial magnetic stimulators), used to treat mood disorders and insomnia. Static magnetic therapy in which magnets are placed on the body also used for pain control and other conditions.

Historically, many EM devices have been considered to be quackery, due to the ongoing paradigm clash and lack of controlled research studies. Further studies are needed in order to understand more about the scientific mechanism of action as well as to document clinical efficacy. Due to low cost and effectiveness, BEM therapies are expected to become more mainstream in the future.

NEED STATEMENT

Students will:

- 1) Develop an in-depth awareness of the differences in scientific worldview between bioelectromagnetics and conventional biomedicine.
- 2) Understand the assumptions underlying bioelectromagnetic therapies and their value to medicine as a cost-effective option to conventional approaches.
- 3) Develop skills needed in identifying essential factors pertaining to the efficacy of electromagnetic healing devices.
- 4) Be able to assist clients as practitioners who recommend bioelectromagnetic devices for various conditions and diseases.
- 5) Develop the critical skills needed to think like a clinician or researcher in evaluating statements of claims and the professional literature on bioelectromagnetic therapies or related consumer products.

FACULTY-STUDENT COMMUNICATION

- **Telephone Contact:** Students should arrange all telephone communications with the instructor by email beforehand. An initial phone contact to clarify course objectives and develop a schedule should be made prior to beginning the course. This contact should be scheduled within the first few weeks of commencement of the semester. After this, periodic telephone communication can be arranged with instructor. All telephone calls will be at student's expense.
- **Email Contact:** Reflection on and questions about the coursework papers and field placement internship should be addressed via email monthly or as needed. Students are always encouraged to contact the instructor via email whenever a problem arises.

- **Communications**

It is requested that students stay in weekly or every other week correspondence with the instructor using email. The student should also set up periodic telephone conversations, at their expense, to discuss problems, concerns, or determine the direction of their course work. Students are always encouraged to contact the instructor by email, fax, or telephone whenever a major concern may arise. It should be understood that as mature students, it is the responsibility of the students to stay in contact with their instructors. The instructor may be able to set up one-on-one discussions with the student using Skype. Students should check email frequently for professor and EMU messages.

Students will normally send communications via email and submit papers as MSWORD format files attached to email messages. Synchronous Internet sessions may be used for "chat sessions" using Yahoo Messenger Chat or Skype. Check with your instructor on the type of communications she uses.

Internet Forums: Please contact our Registrar to be included in the EMU Internet forums.

Length of Course:

Length of this Energy Medicine course is five (5) months or one (1) semester.

COURSE DELIVERY STYLE

Distance Education - Coursework is completed at a location determined by the student utilizing a computer that has the ability to play audio and video clips, with Microsoft Office Word, Excel, PowerPoint, Adobe Reader, along with a current web browser, internet connection and email address. Contact and communication with distance students is typically conducted by telephone, Internet, Skype, text chat, and email. Students are also encouraged to contact the University by facsimiles, and postal mail, and by personal visit to the University.

All lessons, coursework and papers must be copied to lessons@energymedicineuniversity.org from both the student and professor.

Reading assignments, videos, slideshows, and Skype discussions

I. Powerpoint Slideshows and Videos

These consist of overviews on electromagnetic fields and the electromagnetic spectrum for those who need to review or upgrade their physics backgrounds. They will be distributed to students upon registration for the course.

II. Textbook

Valone, Thomas (2007, 8th edition). *Bioelectromagnetic Healing*. Beltsville, MD: Integrity Research Institute.

III. Papers

Digital papers from the peer-reviewed scientific and medical literature will either be emailed or made downloadable to students via Dropbox.com upon registration for the course. Below is the list of 11 papers in the order in which they should be read. A few more papers may be added to this list according to each student's particular interests in research, clinical use, or self-exploration.

1. Rubik B (1994) Perennial challenge of anomalies at the frontiers of science. *Brit Hom J* 83: 155-166.
2. Rubik B (1997) Unifying concept of information in acupuncture and other energy medicine modalities. *J Alt & Complement Med* 3(S1) S67-S76.

3. Liboff AR (2004) Toward an electromagnetic paradigm for biology and medicine. *J Alt & Complement Med* 10(1) 41-47.
4. Valone T, Paning J (2010) Bioelectromagnetic applications for health and healing. *Explore* 19(3).
5. Valone, T. Bioelectromagnetic healing, history and rationale for its use. Retrieved August 15, 2012 from: <http://www.integrityresearchinstitute.org/Bioenergy/BEMsHealingRationale.PDF>
6. Markov MS. (2007) Pulsed electromagnetic field therapy: history, state of the art, and future. *Environmentalist* 27 465-475.
7. Shupak NM (2003) Therapeutic uses of pulsed magnetic field exposure: a review. *Radio Science Bulletin* 307 9-32.
8. Kirsh DL, Smith RB (2004) Cranial electrostimulation therapy for anxiety, depression, insomnia, cognitive dysfunction, and pain: a review and meta-analyses. In: Rosch PJ, Markov MS (eds) (2004) *Bioelectromagnetic Medicine*, chapter 44. New York: Marcel Dekker.
9. Eccles NK (2005) Critical review of random controlled trials of static magnetism for pain relief. *J Alt & Complement Med* 11 (3) 495-509.
10. Markov MS, Hazelwood C, Ericsson A. (2005) Systemic effect: a new approach to magnetic field therapy. *Environmentalist* 25 121-124
11. Markov MS Non-thermal approach is better than thermal in investigating the interaction of electromagnetic fields with biological systems. Retrieved August 15, 2012 from: <http://www.istanbul.edu.tr/Ginternatwshopbioeffemf/cd/pdf/plenary/NON-THERMAL%20APPROACH%20IS%20BETTER%20THAN%20THERMAL.pdf>

IV. Skype sessions. We will have 3 Skype sessions of at least 1 hour duration each to discuss course material. Each student is required to attend. NOTE: Attendance via computer hookup is recommended over use of cellphone due to internet disconnection problems with mobile phones. Your participation and depth of discussion of the course material during these sessions constitutes part of your grade.

Email Contact: Reflection on and questions about the lessons should be addressed via email weekly or as needed. There also may be a student/faculty discussion chat group which creates a larger feedback mechanism though internet communication. Students are always encouraged to contact the instructor via email whenever a problem arises.

COURSE ASSIGNMENTS

Assignment #1: Watch the free Google video about the electric universe theory, “Thunderbolts of the Gods,” online at: <http://video.google.com/videoplay?docid=4773590301316220374>

Assignment #2: Peruse the 2 power point slideshows as a review or to provide background material. If additional background material on fields is needed, consult instructor for additional materials.

Assignment #3: Read papers 1, 2, 3

Assignment #4: Read Valone textbook and papers 4 and 5

Assignment #5: Read papers 6 and 7

Assignment #6: Read paper 8

Assignment #7: Read papers 9 and 10

Assignment #8: Read paper 11

Assignment #9: Write final paper or research report (see below for details)

Final Paper on a Specific Topic or a Preliminary Research Project Proposal & Report

There are 2 options:

- A. Students can conduct a literature review based on secondary and primary source materials and scholarly textbooks. From this, students will write a paper of at least 20 double-spaced pages (font size 12) plus a reference section (additional 2 to 3 pages) using APA Form and Style. The final paper will consist of a specific topic related to the course that must be pre-approved by the instructor. Grades will be given on originality of content and depth of discussion; documentation using scholarly source material with citations, quotations, and references; and also grammar and spelling.
- B. Students can conduct a graduate-level preliminary research project using a consumer health product device based on electromagnetic fields on 2 to 3 human subjects, which must be pre-approved by the instructor. They will write a short research proposal for pre-approval, perform the study, and then write a research report on the study. Grades will be given on content, originality, appropriate research methodology, and attention to reporting detail, and thoroughness of project, as well as grammar and spelling. A template will be provided for the research report. Students should use the APA Form and Style for these documents.

INDIVIDUALIZATION OF STUDENT ASSIGNMENTS

Each research project will be chosen by the student to best support their individual professional goals, yet each student will also benefit from seeing the fruits of all fellow students' research and providing professional criticism of each others work.

Each student will be afforded the opportunity of writing on a subject that is related to his or her field of interest. This will assist the student in making each paper individualized. Also the student is encouraged to go outside the field and obtain research data from other interdisciplinary areas. Each student, based on his or her background, will be encouraged to transfer that theoretical information which the course provides into a practical format in the final paper or project.

COURSE EVALUATION

The course grade will be based upon class participation in conference calls or Skype calls and the quality of the final research paper or project.

COURSE GRADING DETERMINANTS

Grades are based on the following elements of a student's participation and accomplishment. In determining a grade for this course, the following formula will be used:

Reading required texts and on-line readings along with class participation: 1/3

Course paper or project: 2/3

Using this technique, there will be 100 points assigned to the course. Final semester grades will be calculated as follows:

92-100 points = A range

86-91 points = B range

80-85 points = C range

70-80 points = D range

Under 70 points = F

COURSE COMPLETION TIMETABLE

- Week #1: Assignments 1 and 2
- Week #2: Participate in Skype session to discuss course and Assignments 1 and 2
- Week #3-5: Assignment 3
- Week #6-8 Assignment 4 and participate in Skype session on Assignments 3 and 4
- Week #9-10 Assignment 5
- Week #11-12 Assignment 6
- Week #13-14 Assignment 7 and participate in Skype session on Assignments 5-7
- Week #15 Assignment 8
- Week #16 Complete final paper or research report

SPECIAL NOTES AND INSTRUCTIONS

All coursework must be completed in a timely fashion. Students are encouraged to phone or email the instructor whenever they need advice, comments, or instruction.

TEXTS

Valone, Thomas (2007). *Bioelectromagnetic Healing*. Beltsville, MD: Integrity Research Institute.

All other reading material will be provided.

ADDITIONAL RECOMMENDED SOURCES

Barnes F, Greenebaum B (eds) (2007) *Handbook of biological effects of electromagnetic fields*, 3rd edn. Boca Raton, FL: CRC Press.

Bioelectromagnetics Journal, available online by subscription: www.bems.org

Rosch PJ, Markov MS (eds) (2004) *Bioelectromagnetic Medicine*. New York: Marcel Dekker