

Guest Editorial

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This special issue of the International Journal of Engineering Education features a series of selected papers on biomedical engineering education. Biomedical engineering is the application of engineering to solve problems in medicine and biology. Education of biomedical engineers requires learning in traditional engineering disciplines, then learning in medicine and biology, then combining this learning to solve problems in medicine and biology.

Biomedical engineering curricula frequently require lecture courses on bioinstrumentation, biomechanics, biomaterials, physiology for engineers, biomodelling, and biodesign. Many papers in this issue describe alternative approaches to encourage students to find information, develop a systems approach, work with biologists, consider bioethics, develop professionalism, perform design, and develop the skills required to solve biomedical engineering problems.

Huston builds on the learning from basic mechanics courses to solve problems in the three major areas of biomechanics:

- performance
- injury (or illness)
- rehabilitation (or health care).

He recommends that biomechanics be taught by:

- an overview discussing broad applications;
- accelerated remediation in mechanics;
- basic biomechanics itself.

Schreuders and Johnson teach a course that emphasizes the effects of the environment on animals. Students learn the systems approach by keeping crayfish alive in a sealed environment by including plants to supply oxygen.

Johnson and Schreuders teach using an analogic approach in which transport processes include not only the traditional fluid flow, heat transfer, and mass transfer, but also informatics, psychology, population dispersion, and others. Students become familiar with sources and sinks, resistance, capacity, and inertia and then use electrical analogues to solve the problems.

Coger (a mechanical engineer) and de Silva (a biologist) co-teach a biomedical engineering lecture course with students from both disciplines. Two-member cross-disciplinary teams then write a final report and present it.

Ostrander and Roysam teach how to use physical and mathematical principles in order to retrieve and process image information about the biological system. Medical imaging is a fast growing field because it provides much generally non-invasive information to aid in diagnosis.

Blanchard and Carter develop student skills of Internet literacy to find biomedical engineering information. Beyond merely finding, synthesising, and evaluating WWW sources, students publish the results of their research on the Web.

Monzon outlines a bioethics teaching program to cover research ethics such as:

- medically assisted procreation
- the human genome project;
- brain research
- end-of-life issues
- transplantations
- patient's consent
- truth telling
- research methodologies
- professional ethics
- clinical trials
- social ethics
- resource allocation.

King provides the enrolments and composition of biomedical engineering programs in the US, outlines a curricula, points out the role of design and internships and their importance to accreditation, and sources of funding for these programs.

Enderle provides an overview of the NSF Senior Design Projects to Aid Persons with Disabilities program, experiences at three universities and the annual NSF-sponsored publication reporting on these design projects.

Lozano-Nieto describes the academic requirements for clinical engineering and how to increase student professional development by requiring an industrial guest lecture program and a 400-h internship in a hospital.

Viik and Malmivuo surveyed biomedical engineers who studied at Tampere University of Technology and found that 90% of the respondents found their first job in less than three months. The job description of every second respondent was related to biomedical engineering.

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call for papers, publicity to an e-mail list of ASEE Biomedical Engineering Division educators and others, and submission and review using e-mail and Microsoft Word attachments.