



King Saud University
College of Applied Medical Sciences
Department of Biomedical Technology
BMT314 Biomedical Electronics IV 3 (2-1-0)

Current Instructor: Mr. Mostafa Hamid Mohamed, Dr. Javeed Shaikh Mohammed

Course Coordinator: Dr. Javeed Shaikh Mohammed

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Textbook(s) and/or Other Required Materials:

Primary: Digital Systems: Principles & Applications by Ronald J. Tocci (Eleventh Edition), 2010, Pearson Education.

Course Description (catalog):

This course covers: Introduction to the Digital and Analog Systems, Digital Number Systems & Codes, Digital Circuits, Parallel and Serial Transmission, Memory, Digital computers, Conversion of numbers, Parity Method for Error Detection, Logic Gates and Boolean Algebra, Boolean Theorems, DeMorgan's theorems, Combinational Logic Circuits, SOP & POS Forms, Algebraic Simplification, Designing combinational Logic Circuits, K Map Method, XOR, XNOR, Parity Generator and Checker, Troubleshooting Digital Systems, Characteristics of Digital ICs, Internal and External Digital IC Faults, Flip Flop (FF) and related Devices, S-C FF, J-K FF, D FF, asynchronous inputs, FF timing considerations, Shift registers, frequency division and counting, one-shot, troubleshooting FF circuits, Digital arithmetic, Digital system applications.

[http://faculty.ksu.edu.sa/javeed/BMT 314/Forms/AllItems.aspx](http://faculty.ksu.edu.sa/javeed/BMT%20314/Forms/AllItems.aspx)

Prerequisites: BMT212

Co-requisite: None

Course Type: Mandatory

Course Learning Outcomes:

Upon completing BMT314, students should have the following capabilities:

- Knowledge of principles and techniques of modern digital systems.
- Knowledge of analyzing digital system components.
- Knowledge of designing digital system components.
- Ability to conduct experiments using digital system components.
- Knowledge of applications of digital system components in biomedical instrumentation.

Student Outcomes Covered by Course:

a. an ability to select and apply the knowledge, techniques, skills, and modern tools of biomedical technology to include the application of circuit analysis, analog and digital electronics, microcomputers, biomechanics, biomedical instrumentation systems, and safety in the building, testing, operation, and maintenance of biomedical equipment.

Students select and apply the knowledge, techniques, and skills of digital electronics to digital system related activities

b. an ability to select and apply a knowledge of mathematics, chemistry, physics, and biological sciences, engineering, and technology to building, testing, operation, and maintenance of biomedical equipment and the ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of biomedical systems.

Students select and apply knowledge of mathematics, science, engineering, and technology to digital system problems

c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.

Students conduct standard tests and measurements; conduct, analyze, and interpret experiments using digital system components

d. an ability to analyze, design, and implement biomedical systems, components or processes for broadly-defined engineering technology problems appropriate to program educational objectives.

Students design digital system components

e. an ability to function effectively as a member or leader on a technical team.

f. an ability to identify, analyze, and solve broadly-defined biomedical technology problems.

g. an ability to apply written, oral, and graphical communication in both technical and nontechnical environments; and an ability to identify and use appropriate technical literature.

h. an understanding of the need for and an ability to engage in self-directed continuing professional development.

i. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity.

j. a knowledge of the impact of engineering technology solutions in a societal and global context and an understanding of the clinical application of biomedical equipment.

k. a commitment to quality, timeliness, and continuous improvement.

Major Topics covered and schedule in weeks:

1. Overview: Introduction to the course
2. Introductory Concepts
3. Number Systems And Codes
- 5-6. Describing Logic Circuits
- 6-8. Combinational Logic Circuits
- 10-12. Flip Flops & Related Devices
- 12-13. Digital Arithmetic
15. Digital System Applications