King Saud University
College of Applied Medical Sciences
Department of Biomedical Technology

BMT223   Applied Mathematics for BMT II 2 (2-0-0)

Current Instructor: Prof. Mohamad Rizon Juhari
Course Coordinator: Prof. Mohamad Rizon Juhari
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Textbook(s) and/or Other Required Materials: Primary: Anthony Croft, Robert Davison, "Mathematics for Engineers: A modern interactive approach", Addison-Wesley, 2003.

Course Description (catalog): The function rule, The graph of a function, Composition of functions, Inverse of a function, Continuous and discontinuous functions, Periodic functions, Linear functions, Common engineering functions, Differentiation, Higher derivatives, Product, quotient, and Chain rule, Implicit, Parametric, and Logarithmic differentiation, Tangents and normals, Maximum and minimum of a function, Integration, Definite integrals, Area bounded by a curve, Integration by parts, by substitution, by partial fractions, Trigonometrical functions, Volume of revolution, Calculating centers of mass, Moment of inertia, Length of a curve and the area of a surface of revolution, Mean and root-mean-square value of a function, Basic concepts of differential equations, Separation of variables, Solving first-order linear equations, Second-order linear constant-coefficient equations, Laplace transform, Inverse Laplace transform, Applications, Fourier Series and Fourier transform.

Prerequisites: BMT222
Co-requisite: None
Course Type: Mandatory

Course Learning Outcomes:
Upon completing BMT223, students should have the following capabilities:
1. Understanding of mathematical functions, the differentiation and its application.
2. The knowledge of important techniques of integration and their applications.
3. To know how to solve the differential equations.
4. Develop an ability to understand the Laplace and Fourier transform and their applications.

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.
Understanding of mathematical functions, the differentiation and its application

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.

The ability to understand the important techniques of integration and their applications. Ability to solve the differential equations.

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

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

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

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f. an ability to identify, analyze, and solve broadly-defined biomedical technology problems.
Students demonstrate an ability to use differential equations, Separation of variables, Solving first-order linear equations, Second-order linear constant-coefficient equations, Laplace transform, Inverse Laplace transform, Applications, Fourier Series and Fourier transform.

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.

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

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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.

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

Major Topics covered and schedule in weeks:
1. Functions
2. Derivatives of algebraic and trigonometric functions
3. Application of differentiation
4. Definite and indefinite integrations
5. Application of definite and indefinite integrations
6. First and second order ordinary differential equations
7. Introduction to Laplace Transform
8. Introduction to, Fourier Series and Fourier Transform