The BME 3512 Bioelectronics course is partitioned into essentially seven areas, divided into four tests:

Test One - Principles of DC and AC Circuits
   Review of Basic Concepts and Principles of DC and AC Currents and Voltages
Test Two - (BJT and FET Transistors)
   PN Junction and Diode Applications
   Bipolar Junction Transistors (BJTs)
   Field Effect Transistors (FETs)
Test Three - (Operational Amplifiers)
   Principles of Oscillators, Waveform Generators, and Small Signal Amplifiers
   Operational Amplifiers and Op-Amp Applications
Test Four -Digital Electronics
   Digital Electronics and Integrated Circuits (IC's)

Students are responsible for all of the assigned reading material. Not all of the material will be covered during class lectures; nevertheless, it is considered essential to understanding the course material and for successfully achieving the course learning objectives. Students who fall behind, will most likely be left behind. It is up to you to keep current.

The main textbook, *Practical Electronics for Inventors*, 3ed by Paul Scherz and Simon Monk (McGraw Hill, 2013) is a thorough and utilitarian textbook for a hands-on electronics class such as BME 3512. Electronic theory is presented in a straight-forward, easy-to-read and to understand manner. Various chapters cover passive and active components; AC and DC circuits; filters; power supplies; semiconductors (diodes, transistors, optoelectronics); integrated electronics (operational amplifiers, oscillators, timers, voltage regulators); audio electronics; digital electronics (logic gates, sequential and combinational logic, counters, shift registers, buffers, latches, drivers, displays, memory devices); motors (AC, DC, RC servos, stepper) as well as sections on safety; wiring & grounding information; useful facts, formulas, component data; laboratory instruments/measurements; error analysis; and micro-controller circuits.

Supplementing the main textbook is Cathey & Nasar's *Schaum's Outline Of Electrical Engineering*, 2ed (McGraw Hill, 1997) which not only contains additional explanatory reading material, but also a wealth of practical problems. Each chapter includes both *solved problems* and *supplemental problems.* Answers are provided for all questions/problems. Students should feel competent in solving each type of example problem. The assigned homework problems will be used as models for exam questions. Students are encouraged to work collaboratively and to seek help from the instructor as needed. An electronic calculator is highly recommended.

The proposed schedule is tentative. The topics and subtopics are guidelines and are not meant to be restrictive or all inclusive. If necessary and at the instructor's discretion the order and timing of the topics may be altered during the course of the semester.

Reading assignments and suggested homework problems are intended to supplement the in-class lectures. See pages 2 - 5 of this document for a list of reading assignments and homework assignments arranged according to the four tests areas.

Handy References: *Practical Electronics for Inventors* (3ed).

Appendix A	Power Distribution	pp 953 - 958
Appendix B	Error Analysis	pp 959 - 962
Appendix C	Useful Facts and Formulas	pp 963 - 968

Review of the Principles of DC & AC Current and Voltage

Reading Assignment:

Practical Electronics for Inventors, 2ed Paul Scherz, *McGraw Hill, 2007*

Basic Concepts

Chapter 1 Introduction to Electronics	Sections 1.1 - 1.5	Pages 1 - 3
Chapter 3 Basic Electronic Circuit Components	Sections 3.1 - 3.4	Pages 265 - 311
Chapter 3 Basic Electronic Circuit Components	Sections 3.9	Pages 408 - 410
Chapter 14 Hands-On Electronics	Sections 14.1 - 14.5	Pages 823 - 896

Principles of DC Circuits

Chapter 2 Theory	Sections 2.1 - 2.19	Pages 5 - 80
Chapter 3 Basic Electronic Circuit Components	Sections 3.5	Pages 311 - 336

Principles of Alternating Voltages and Currents, Complex Impedance, Passive (RCL) Filters

Chapter 2 Theory	Sections 2.20 - 2.36	Pages 80 - 242
Chapter 3 Basic Electronic Circuit Components	Sections 3.6 - 3.8	Pages 336 - 408

Practical Electronics for Inventors, 3ed Paul Scherz and Simon Monk, McGraw Hill, 2013

Basic Concepts

Chapter 1 Introduction to Electronics	Sections 1.1 - 1.5	Pages 1 - 3
Chapter 3 Basic Electronic Circuit Components	Sections 3.1 - 3.4	Pages 253 - 299
Chapter 3 Basic Electronic Circuit Components	Sections 3.9	Pages 397 - 399
Chapter 7 Hands-On Electronics	Section 7.1 - 7.5	Pages 551 - 634

Principles of DC Circuits

Chapter 2 Theory	Sections 2.1 - 2.19	Pages 5 - 80
Chapter 3 Basic Electronic Circuit Components	Sections 3.5	Pages 299 - 324

Principles of Alternating Voltages and Currents, Complex Impedance, Passive (RCL) Filters

Chapter 2 Theory	Sections 2.20 - 2.36	Pages 80 - 245
Chapter 3 Basic Electronic Circuit Components	Sections 3.6 - 3.8	Pages 324 - 396

Schaum's Outline Of Electrical Engineering, **2ed Cathey & Nasar, McGraw Hill, 1997**

Reading Assignment:

Chapter 1 Circuit Elements and Laws	Section 1.3	Pages 2 - 3
Chapter 2 Analysis of Resistive Circuits	Sections 2.1 - 2-7	Pages 16 - 19
Chapter 3 AC Circuits Under Steady State	Sections 3.1 - 3.7	Pages 29 - 36
Chapter 4 Transient Circuit Analysis	Sections 4.1 - 4.3	Pages 48 - 52

Problems:

Pages 5 - 15	Problems 1.4, 20, 21, 23, 24, 25, 27, 38, 44, 48
Pages 20 - 27	Problems 2.4, 5, 6, 9, 12, 15, 19, 20, 21, 22, 23, 24
Pages 40 - 46	Problems 3.7, 11, 28
Pages 52 - 59	Problems 4.1, 2, 3, 4, 5, 6, 11, 13, 14

PN Junctions, Diodes, Bipolar Junction Transistors (BJT) and Field Effect Transistors

Reading Assignment:

Practical Electronics for Inventors, 2ed Paul Scherz, *McGraw Hill, 200*

    Chapter 4   Semiconductors   Sections 4.1 - 4.5   Pages 411 - 501

Practical Electronics for Inventors, 3ed Paul Scherz and Simon Monk, McGraw Hill, 2013

    Chapter 4   Semiconductors   Sections 4.1 - 4.5   Pages 401 - 491

Schaum's Outline Of Electrical Engineering, **2ed Cathey & Nasar, McGraw Hill, 1997**

    Chapter 7 Diodes   Sections 7.1 - 7.10   Pages   98 - 111
    Chapter 8 Bipolar Junction Transistors   Sections 8.1 - 7.8   Pages 129 - 138
    Chapter 9 Field Effect Transistors   Sections 9.1 - 9.7   Pages 155 - 162

Operational Amplifiers (Op-Amps)

Reading Assignment: Principles of Oscillators, Waveform Generators, Op-Amps, and Active Filters

Practical Electronics for Inventors, 2ed Paul Scherz, *McGraw Hill, 2007*

Chapter 7 Operational Amplifiers	Sections 7.1 - 7.17	Pages 537 - 563
Chapter 8 Filters	Sections 8.1 - 8.9	Pages 565 - 584
Chapter 9 Oscillators and Timers	Sections 9.1 - 9.6	Pages 585 - 600

Practical Electronics for Inventors, 3ed Paul Scherz and Simon Monk, McGraw Hill, 2013

Chapter 8 Operational Amplifiers	Sections 8.1 - 8.17	Pages 635 - 661
Chapter 9 Filters	Sections 9.1 - 9.9	Pages 663 - 682
Chapter 10 Oscillators and Timers	Sections 10.1 - 10.6	Pages 683 - 698

Schaum's Outline Of Electrical Engineering, **2ed Cathey & Nasar, McGraw Hill, 1997**

Chapter 10 Operational Amplifiers	Sections 10.1 - 10.9	Pages 174 - 179

Digital Electronics

Reading Assignment: Digital Electronics, Switching Circuits, Principles of Waveform Generators

Practical Electronics for Inventors, 2ed Paul Scherz, *McGraw Hill, 2007*

    Chapter 12   Digital Electronics   Sections 12.1 - 12.12   Pages 631 - 777

Practical Electronics for Inventors, 3ed Paul Scherz and Simon Monk, McGraw Hill, 2013

    Chapter 12   Digital Electronics   Sections 12.1 - 12.12   Pages 717 - 858

***Schaum's Outline Of Electrical Engineering*, 2ed Cathey & Nasar, McGraw Hill, 1997**

    Chapter 11 Switching Logic and Circuits   Sections 11.1 - 11.5   Pages 192 - 197
        Solved Problems: Pages 198 - 203   # 1, 2, 6, 12
        Supplementary Problems: Pages 205 - 205   # 15, 16, 17, 18

    Chapter 12 Digital Logic Applications   Sections 12.1 - 12.3   Pages 208 - 212
        Solved Problems: Pages 212 - 218   # 1 - 21
        Supplementary Problems: Pages 219 - 221   # 22 - 39