### ATTACHMENT 5.

**Kingdom of Saudi Arabia**

**The National Commission for Academic Accreditation & Assessment**

**T6. Course Specifications**

**(CS)**

**Course Specifications**

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| Institution **King Saud University** Date |
| College/Department **College of applied medical sciences/ biomedical technology** |

A. Course Identification and General Information

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| 1. Course title and code: **BIOMEDICAL ELECTRONICS II- BMT 212** |
| 2. Credit hours **4 hrs** |
| 3. Program(s) in which the course is offered.  (If general elective available in many programs indicate this rather than list programs)  **Biomedical Technology- Instruments** |
| 4. Name of faculty member responsible for the course  **Dr. Mohamed Souheil Alabed** |
| 5. Level/year at which this course is offered  **4th level** |
| 6. Pre-requisites for this course (if any)  **BMT211** |
| 7. Co-requisites for this course (if any)  NA |
| 8. Location if not on main campus  **on main campus** |
| 9. Mode of Instruction (mark all that apply)  90%  ✓  a. traditional classroom What percentage?  b. blended (traditional and online) What percentage?  ✓  10%  c. e-learning What percentage?  d. correspondence What percentage?  f. other What percentage?  Comments: |

B Objectives

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| 1. What is the main purpose for this course?  **In this course students will learn**  **1. The properties of semiconductors and how N-material and P- material produced.**  **2. How semiconductor diodes produced and applied in circuits.**  **3. How to analyse diode circuits using methods learned in previous course (BMT211).**  **4. Characteristics of Bipolar Junction Transistor (BJT).**  **5. Ways of biasing BJT .**  **6. How to simplify BJT networks using transistor modelling.**  **7. Characteristics of Junction Field- Effect Transistor (JFET) .**  **8. Ways of biasing JFET.**  **9. How to to simplify JFET networks using transistor modelling**  **10 How to analyse BJT and JFET in small signal circuits and in compound configurations.**  **11. The effects of source and load resistors RS and RL.** |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)   * **Offering extra hours for problem solving (Tutorial)** * **Modifications to the course.** * **Synchronization laboratory sessions with theory sessions.** * **Adding new equipment to laboratory, new teaching techniques** |

C. Course Description (Note: General description in the form used in Bulletin or handbook)

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| Course Description:  **This course is an introductory course to electronic devices and contains the basics of electronics, semiconductor diodes, diode applications, bipolar junction transistor (BJT), DC biasing BJT, Field- Effect Transistor, FET Biasing, BJT transistor modeling, BJT small signal analysis, FET small signal analysis. It contains also the use of transistor as amplifier in electronic circuits and application on biomedical instruments**. |

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| 1 Topics to be Covered | | |
| Topic | No. of  Weeks | Contact hours |
| **Semiconductor Diodes (theory)** | **1** | **3** |
| **Diode applications** | **2** | **6+4** |
| **Bipolar Junction Transistor** | **1** | **3+2** |
| **DC Biasing BJT** | **2** | **6+2** |
| **BJT Transistor Modelling** | **1** | **3+2** |
| **BJT small signal analysis** | **2** | **6+4** |
| **Field- Effect Transistor** | **1** | **3+2** |
| **FET Biasing** | **1** | **3+2** |
| **FET small signal analysis** | **1** | **3+2** |
| **System approach, effects of RS and RL** | **1** | **3+2** |
| **BJT and JFET frequency-response** | **1** | **3+2** |

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| 2. Course components (total contact hours and credits per semester): | | | | | | |
|  | Lecture | Tutorial | Laboratory | Practical | Other: | Total |
| Contact  Hours | **3\*14=42hrs** | **NA** |  | **2\*14=24** |  | **70 hrs** |
| Credit | **3** | **NA** |  | **1** |  | **4** |

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| 3. Additional private study/learning hours expected for students per week.  **3hrs** |

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| 4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy |
| On the table below are the five NQF Learning Domains, numbered in the left column.  **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.) |

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|  | **NQF Learning Domains**  **and Learning Outcomes** | **Teaching**  **Strategies** | **Assessment**  **Methods** |
| **1.0** | **Knowledge** | | |
| 1.1 | * Ability to select and define the knowledge, techniques, skills, and modern tools of biomedical technology | * **Assigned readings and written analyses of them** | * **2 Mid-Term examinations** * **Take-home assignments** * **2 Quizzes** |
| 1.2 | * Ability to select and define a knowledge of mathematics, sciences, engineering, and technology to building, testing, operation, and maintenance of biomedical equipment | * **Lectures/ small group discussion/** | * **2 Mid-Term examinations** * **Take-home assignments** * **2 Quizzes** |
| 1.3 | * Ability to recognize the societal and global impact of engineering technology solutions. | * **Class and group discussions** | * **2 Mid-Term examinations** * **Take-home assignments** * **2 Quizzes** |
| 1.4 |  |  |  |
| **2.0** | **Cognitive Skills** | | |
| 2.1 | * Ability to analyse data , and interpret results. | * **Assigned readings and model analyses of them via lecture and by provision of examples** | * **Essay quizzes** * **Written assignments** * **Individual / group presentations** * **Class participation** * **Discussions in groups and / or pairs** |
| 2.2 | Ability todesign, and develop biomedical systems, components or processes for broadly-defined engineering technology problems appropriate to program educational objectives | * **Written assignments requiring comparison / contrasting or argumentation and then organize and synthesize them into essay.** | * **2 Mid-Term examinations** * **Take-home assignments** * **2 Quizzes** |
| 2.3 | * Ability to identify, analyze, and solve broadly-defined biomedical technology problems. | * **Assignment of individual and group tasks for presentations** | * **2 Mid-Term examinations** * **Take-home assignments** * **2 Quizzes** |
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| **3.0** | **Interpersonal Skills & Responsibility** | | |
| 3.1 | * **Ability to demonstrate an effective role as a member or leader on a technical team.** | * **Group work in some assignments** | * Show and explain requirements and criteria to students before assignments so they know what qualities are desirable to demonstrate |
| 3.2 | * Acquire an understanding of the need for and an ability to engage in self-directed continuing professional development | * **Group work in some reports** | * Give feedback on group process along with feedback on content |
|  | * Acquire an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity | * **Group work in some lab experiments** | * **2 Mid-Term examinations** * **Take-home assignments** * **2 Quizzes** |
|  | * demonstrate commitment to quality, and continuous improvement. | * **Group work in some presentations** | * **2 Mid-Term examinations** * **Presentations** * **2 Quizzes** |
| **4.0** | **Communication, Information Technology, Numerical** | | |
| 4.1 | * Ability to apply written, oral, and graphical communication in technical environment * Ability to use computer software and information technology skills * Ability to use mathematics and numerical skills | * **Initial assessment of IT skills as part of orientation. Training given at different levels of skill in first semester and again in second year.** * **Require that written homework be typed in proper format** * **Include the use of PowerPoint as a necessary component of a presentation** * **Assign research papers that must include analysis of material taken from acceptable web sites.** * **Numerical skills assessed during orientation. Special tutorials provided for those in need. Assignments include numerical analysis whenever relevant to topic concerned** | * **Essay exams** * **Essay quizzes** * **written assignments** * **Presentations** |
| 4.2 |  |  |  |
| **5.0** | **Psychomotor** | | |
| 5.1 | **Ability to perform biomedical technology procedures and systems.** | **Lab demonstration/ small group work/** | **Practical participation**  **Practical exam** |
| 5.2 | * Ability to conduct standard tests and measurements; to conduct experiments; and to apply experimental results to improve processes. |

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| 5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.) | | | | | | | | | | | | | | | |
| **Course**  **LOs #** | **Program Learning Outcomes**  **(Use Program LO Code #s provided in the Program Specifications)** | | | | | | | | | | | | | | |
| **1.1** | **1.2** | **1.3** | **2.1** | **2.2** | **2.3** | **3.1** | **3.2** | **3.3** | **3.4** | **4.1** | **4.2** | **4.3** | **5.1** | **5.2** |
| **1.1** | **A** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **1.2** |  | **P** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **2.1** |  |  |  | **P** |  |  |  |  |  |  |  |  |  |  |  |
| **2.2** |  |  |  |  | **I** |  |  |  |  |  |  |  |  |  |  |
| **4.1** |  |  |  |  |  |  |  |  |  |  | **I** |  |  |  |  |
| **4.2** |  |  |  |  |  |  |  |  |  |  |  | **I** |  |  |  |
| **4.3** |  |  |  |  |  |  |  |  |  |  |  |  | **P** |  |  |

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| 5. Schedule of Assessment Tasks for Students During the Semester | | | |
| Assessment | Assessment task (eg. essay, test, group project, examination etc.) | Week due | Proportion of Final Assessment |
| **1** | **Quiz1 test** | **3** | **2.5%** |
| **2** | **Midterm1 test** | **6** | **15%** |
| **3** | **Quiz2 test** | **9** | **2.5%** |
| **4** | **Midterm2 test** | **12** | **15%** |
| **5** | **Homeworks** | **continuous** | **5%** |
| **6** | **laboratory reports** | **continuous** | **10%** |
| **7** | **Practical exam** | **13** | **10%** |
| **8** | **Final exam** | **15** | **40%** |

D. Student Academic Counseling and Support

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| 1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)   * At least 20 office hours a week are available for students (detailed timetable of office hours is attached to the office door and on my website) |

E Learning Resources

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| 1. List Required Textbooks  **Text Books: Robert L. Boylestad, "Electronic Devices and Circuit Theory", 9th Edition, Prentice Hall,** **2006.** |
| 2. List Essential References Materials (Journals, Reports, etc.)  **Lecture notes** |
| 3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)  **Thomas L. Floyd, “Electronic Devices Conventional Current Version”, 7th edition, Prentice Hall, 2005** |
| 4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.  **• Lecture** **notes ((PowerPoint slides are available on Blackboard)**  **• Website of text book publisher (http://wps.prenhall.com/chet\_boylestad\_electronic\_9)** |
| 5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.   * Lecture notes (available on my website and LMS system) * Website of text book publisher * Software programs as SPICE, Nida are available in laboratory to help students understanding subjects taught in class. |

F. Facilities Required

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| Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.) |
| 1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)   * **Classrooms with 25 seats and one** **Smart Board for theoretical lectures.** * **Laboratory with facilities (seats, circuit boards, tool sets, computers etc.) for 20 students.** |
| 2. Computing resources (AV, data show, Smart Board, software, etc.)   * **One computer per experiment in laboratory with necessary licensed software.** |
| 3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)  **Enough devices for each experiment in laboratory (voltmeter, oscilloscope, signal generator etc.) a list of tools and equipment is available.** |

G Course Evaluation and Improvement Processes

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| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching   * **Confidential completion of standard course evaluation questionnaire** * **Group discussion with small groups of students.** * **Results of exams and tests.** |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department   * **Observations and assistance from colleagues** * **Independent assessment of standards achieved by students** * **Independent advice on assignment tasks** |
| 3 Processes for Improvement of Teaching   * **Enrollment in courses for developing teaching skills** * **Attendance workshops on teaching methods** * **Review of recommended teaching strategies periodically** |
| 4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)   * **10% of students’ answer papers are reviewed by a colleague from department.** |
| 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.   * **Peer review will be implemented by the department soon** * **using survey results; strengths and weaknesses can be spotted** * **Feedback is gained also through oral and written exams and tests where difficulties are spotted. According to the results difficulties will be handled in the next semesters.** |

Name of Instructor: **Dr. Mohamed Souheil Alabed**

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Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date Report Completed: \_\_\_\_\_\_\_\_\_\_\_\_

Name of Field Experience Teaching Staff \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Program Coordinator:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date Received: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_