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| College | Engineering and Technology | | |
| Department | Electrical Engineering Department | | |
| Program | | | |
| Course Title | Electronics | Course Number: | 12120205 |
| Year | 2019/2020 | Semester: | Fall |
| Prerequisite(s) | Electrical Circuits | | |
| Instructor | Dr. Wael Salah | | |
| Instructor's e-mail | w.salah@ptuk.edu.ps | | |
| Office Hours | SUN,TUE,THU () | | MON,WED () |
| Class Time | SUN/TUE/THU: | Class Room: | H120 |
| Course description | <p>An essential course for freshmen students in the Automation Engineering, Computer Engineering, Communication Engineering and Mechatronics Engineering departments. This course is designed to foster the foundation and principles of electronics. In this course, a verity of topics will be covered such as:</p> <p>Atomic structure, classification of materials as insulators, conductors and semiconductors, N-Type and P-Type semiconductors , the diode , biasing the diode , i-v characteristic of a diode, diode models , half wave rectifier, full wave rectifier, power supply filters and regulators, diode limiting and clamping circuits, the zener diode and its applications, other special purpose diodes, BJT structure, basic BJT operation, BJT characteristics and parameters, BJT as amplifier, BJT as a switch the dc operating point, voltage divider bias, common emitter amplifier, common collector amplifier, common base amplifier, JFET, JFET biasing, MOSFET, MOSFET biasing, basics of op/amps</p> | | |
| Course Intended Learning Outcomes (CILOs) | <p>A) Knowledge and understanding</p> <ol style="list-style-type: none"> 1- Demonstrate knowledge of the fundamental and constituent of electronics and their applications. 2- Apply engineering principles including design, analysis, and validation. <p>B) Intellectual/Cognitive skills</p> <ol style="list-style-type: none"> 1- Design an effective electronics circuit based on simulation, components, and sub-system. 2- Evaluate specifications, define and solve problems. 3- Work effectively as part of a team and learn independently. 4- Organize works and apply project management. | | |



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| | <p>C) Subject specialization and practical skills</p> <p>1- Consider and assess a variety of methods and tools in the electronics world.</p> <p>2- Know state-of-the-art-in this area.</p> <p>D) General and transferable skills</p> <p>1- Resolving problems, issues, challenges, and be able to troubleshoot successfully.</p> |
| Textbook(s) | ELECTRONIC DEVICES, Conventional Current Version, 9th Edition By : Thomas L. Floyd |
| Other required material (References): | <p>1- Electronic Devices and circuits , second edition, Jimmie J. cathey</p> <p>2- Theory and design of electrical and electronic circuits, Tait. E</p> <p>3- Electronic Devices and amplifier circuits , Steven T Karris</p> <p>4- Electronic circuit analysis and design, 2nd edition ,Donald Neamen</p> <p>5- The art of electronics ,2nd edition, Paul Horowitz</p> |
| Other Resources used (e.g. e-learning, field visits, periodicals, software, etc.) | |

Academic Quality Assurance Department

Course Syllabus Form

| Course Teaching Methods | |
|-------------------------------------|---|
| Teaching Method | CILOs |
| Interactive lectures | Knowledge and understanding |
| Discussion + Problem based learning | Intellectual/Cognitive skills |
| Tutorials + Simulations | Subject specialization and practical skills |
| Problem solving | General and transferable skills |

| Assessment Type | Details/Explanation of assessment in relation to CILOs | Weight | Date(s) |
|-----------------------------|--|--------|---|
| First Exam | | 30 | 5 th – 7 th Week |
| Second Exam | | 30 | 9 th – 11 th Week |
| Quizzes | | | |
| Assignments | | | |
| Project | | | |
| Laboratory/Practical | | | |
| Final Exam | | 40 | 16 th Week |
| Total | | 100% | |



| Course Intended Learning Outcomes (CILOs) | | | | |
|---|-------------------------|---|---|---|
| CILOs | Mapping to Program ILOs | | | |
| | a | b | c | d |
| On successful completion of the course, students will be able to: | | | | |
| Get the basic knowledge of electronics from the material and atomic structure perspective | √ | | | |
| Get the basic knowledge of diodes and their applications | √ | √ | √ | √ |
| Get the basic knowledge of Zener diodes and their applications | √ | √ | √ | √ |
| Get the basic knowledge of BJT including characteristics, biasing, and applications | √ | √ | √ | √ |
| Get the basic knowledge of BJT amplifiers | √ | √ | √ | √ |
| Get the basic knowledge of FET transistors including characteristics and biasing | √ | √ | √ | √ |

| Course Weekly Breakdown | | | | | |
|-------------------------|------|--|-------------|-----|------------|
| Week | Date | Topics Covered | CILOs | Lab | Assessment |
| 1 | | Introduction to Electronics <ul style="list-style-type: none"> ✓ Atomic structure ✓ classification of materials ✓ N-Type and P-Type SC | A | | First Exam |
| 1 | | Diodes and Applications: <ul style="list-style-type: none"> ✓ The diode ✓ Diode biasing ✓ I-V characteristic of a diode ✓ Diode models ✓ Half wave rectifier ✓ Full wave rectifiers ✓ Power supply filters ✓ Power supply Regulators ✓ Diode limiters and clampers | A,B,C, D | | |
| 3,4,5 | | Special Purpose Diodes: <ul style="list-style-type: none"> ✓ Zener diode ✓ Zener applications ✓ Other special purpose diodes | A,B,C, D | | |



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| 6,7,8,9 | Bipolar Junction Transistors BJTs <ul style="list-style-type: none"> ✓ Basic operation ✓ BJT characteristics and parameters ✓ BJT as an Amplifier ✓ BJT as a switch | A,B,C, D | Second Exam |
| 10,11, 12,13 | Transistor Bias Circuits: <ul style="list-style-type: none"> ✓ The DC operating point ✓ Voltage-divider bias | A,B,C, D | |
| | BJT Amplifiers: <ul style="list-style-type: none"> ✓ Amplifier operation ✓ Transistor AC models ✓ Common-Emitter Amplifier ✓ Common-Base Amp (briefing) ✓ Common-Collector Amps briefing) ✓ Multi-stage Amp (briefing) ✓ Differential Amp (briefing) | A,B,C, D | Final Exam |
| | Field-Effect Transistors (FETs) <ul style="list-style-type: none"> ✓ The JFET characteristics ✓ The JFET biasing ✓ The MOSFET characteristics ✓ The MOSFET biasing | A,B,C, D | |
| | The Operational Amplifier One lecture briefing | A | |

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| Prepared by: | Dr. Wael Salah | Signature | |
| Head of Department | | Signature | |
| Date | | | |