



Jordan University of Science and Technology
Faculty of Engineering
Nuclear Engineering Department

NE413 Radiation Detection And Measurement Lab II

First Semester 2019-2020

Course Catalog

1 Credit Hours. One credit hour (3 h lectures). Gamma, alpha, and beta detectors, gamma spectroscopy, coincidence counting, proportional counters, HPGe detectors, spectrum analysis, scintillation detectors for charged particle.

Text Book

| | |
|--------------------------|---|
| Title | Radiation Detection and Measurement Lab. II Manual. |
| Author(s) | Nuclear Engineering Department, JUST |
| Edition | 1st Edition |
| Short Name | TB1 |
| Other Information | |

Course References

| Short name | Book name | Author(s) | Edition | Other Information |
|------------|-------------------------------------|----------------|-------------|-------------------|
| Ref#1 | Radiation Detection and Measurement | Glenn F. Knoll | 3rd Edition | |

Instructor

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|------------------------|---|
| Name | Mr. Neil Abu Ennab |
| Office Location | E2 L-2 |
| Office Hours | Sun : 10:30 - 11:30 Mon : 08:00 - 09:00 Tue : 10:30 - 11:30 Tue : 11:30 - 12:30 Tue : 12:30 - 13:30 Thu : 10:30 - 11:30 Thu : 11:30 - 12:30 |
| Email | nrabuennab@just.edu.jo |

| Class Schedule & Room |
|--|
| Section 2: Lecture Time: Thu : 14:30 - 17:30 Room: LAB Section 3: Lecture Time: Sun : 14:30 - 17:30 Room: LAB |

| Prerequisites | | |
|----------------------|---|--------------------------|
| Line Number | Course Name | Prerequisite Type |
| 2003120 | NE312 Radiation Detection And Measurement Lab I | Prerequisite / Study |

| Tentative List of Topics Covered | | |
|---|--|--------------------------------------|
| Weeks | Topic | References |
| Week 1 | Introduction | experiment 1 From TB1 |
| Week 2 | General characteristics of radiation detectors | experiment 2 From TB1 |
| Week 3 | Counting statistics and error propagation | experiment 3 From TB1 |
| Week 4 | Sodium Iodine (NaI) detector | experiment 4 From TB1 |
| Weeks 5, 6 | High Purity Germanium (HPGe) detector | experiment 5 From TB1 |
| Weeks 7, 8 | Spectrum Analysis | experiment 6 From TB1 |
| Week 9 | Energy Calibration | experiment 7 From TB1 |
| Week 10 | Detection Resolution | experiment 8 From TB1 |
| Week 11 | Detection Efficiency | experiment 9 From TB1 |
| Weeks 12, 13 | Mass Absorption Coefficient | experiment 10 From TB1 |

| Mapping of Course Outcomes to Program Student Outcomes | Course Outcome Weight (Out of 100%) | Assessment method |
|---|--|-----------------------------------|
| Ability to use the techniques, skills, and modern engineering tools necessary for engineering practices [11, 15] | 15% | midterm exam, final exam |
| Ability to design and perform nuclear and radiation experiments to gather, analyze and interpret the results [11, 13, 14, 16] | 10% | midterm exam, final exam |
| Ability to use oral, graphic and written communication effectively [11, 13, 16] | 30% | midterm exam, reports, final exam |
| Ability to practice leadership and learn and work independently and in multidisciplinary teams [13, 15] | 10% | reports |

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|---|-----|-----------------------------|
| The students will be able to have the knowledge on the theory and practice of radiation detection [11, 16] | 10% | midterm exam, final exam |
| The students will be able to have the knowledge on how Geiger tube works and its characteristics (e.g. plateau, efficiency and resolving time) [11] | 25% | midterm exam, final exam |

| Relationship to Program Student Outcomes (Out of 100%) | | | | | | |
|--|---|-------|------|-------|-------|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 50 | | 17.50 | 2.50 | 12.50 | 17.50 | |

| Evaluation | |
|-----------------|--------|
| Assessment Tool | Weight |
| midterm exam | 30% |
| reports | 30% |
| final exam | 40% |

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