

| GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
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| ECTS FORM                                                      |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Course Code and Title                                          |                             | ILT 548 DOSIMETRY MEASUREMENT METHODS                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Credits                                                        |                             | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| ECTS                                                           |                             | 7.5                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Name of Lecturer And e-mail address                            |                             | Prof. Dr. Elif ORHAN , <a href="mailto:eliforhan@gazi.edu.tr">eliforhan@gazi.edu.tr</a> Assoc. Prof. Dr. Sema Bilge Ocak <a href="mailto:sbocak@gazi.edu.tr">sbocak@gazi.edu.tr</a>                                                                                                                                                                                                                                                                           |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Department/Program                                             |                             | Advanced Technologies                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Course Type                                                    |                             | Elective                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Course Language                                                |                             | Turkish                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Course Semester                                                |                             | Fall/Spring                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Prerequisites                                                  |                             | None                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Course Objectives                                              |                             | The students coming from different disciplines are aimed to learn dose calculation techniques, characteristics of dosimetric parameters and dosimetry readers.                                                                                                                                                                                                                                                                                                |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Course Contents                                                |                             | Dose calculation techniques. Dosimetric principles. Dose distributions. Luminescence mechanism and general features. Principles and methods of thermoluminescence. Characteristics of thermoluminescence matters. Thermoluminescence dosimetry readers. Clinical applications of thermoluminescence dosimetry. Photon, alpha and beta dosimeters. Personnel and area dosimeters. Characteristics of personnel and area dosimeters. Measurement uncertainties. |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Course Learning Outcomes                                       |                             | Ability to use technical /modern materials to be required in her/his works, ability to present oral and written forms in her/his field, ability to work on interdisciplinary studies, ability to rapidly distinguish the true an required knowledge and ability to do analyze of results.                                                                                                                                                                     |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| References<br><br>(References must be up to date)              |                             | Books                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          | 1. Fundamentals of radiation dozimetry.<br>J.R.Greening, Taylor &Francis group,<br>ISBN: 9780852747896, 1985.<br>2. Radiation dozimetry, Gad Shani, ISBN-13: 978-0849315053, 2000<br>3. Thermoluminescence of Solids, S. W. S. McKeever, ISBN: 9780521368117, 2011<br>4. Measurement, Dosimetry, and Health Effects, Second Edition Lev S. Ruzer, Naomi H. Harley, ISBN: 9781439855102, 2012. |          |         |                |       |      |
|                                                                |                             | Journals, Articles, Papers, Symposiums                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Planned learning activities and teaching methods               |                             | Theoric                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Practice                 | Lab.                                                                                                                                                                                                                                                                                                                                                                                          | Projects | Assign. | Other          | Total | ECTS |
|                                                                |                             | 42                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |                                                                                                                                                                                                                                                                                                                                                                                               | 76       | 30      |                | 188   | 7.5  |
| Assessment Methods and Criteria                                |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quantity (mark with “X”) |                                                                                                                                                                                                                                                                                                                                                                                               |          |         | Percentage (%) |       |      |
| Midterm Exam                                                   |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               | X                        |                                                                                                                                                                                                                                                                                                                                                                                               |          |         | 30             |       |      |
| Quiz                                                           |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Assignment                                                     |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               | X                        |                                                                                                                                                                                                                                                                                                                                                                                               |          |         | 10             |       |      |
| Projects                                                       |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               | X                        |                                                                                                                                                                                                                                                                                                                                                                                               |          |         | 20             |       |      |
| Laboratory                                                     |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Practice                                                       |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Other                                                          |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Final Exam                                                     |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               | X                        |                                                                                                                                                                                                                                                                                                                                                                                               |          |         | 40             |       |      |
| WEEKLY COURSE PLAN                                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| Week                                                           | Contents and topics         |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| 1. Week                                                        | Dose calculation techniques |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |
| 2. Week                                                        | Dosimetric principles       |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                                                                                                                                                                                                                                                                                                                                                                               |          |         |                |       |      |

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|-----------------|-------------------------------------------------------|
| <b>3. Week</b>  | Dose distributions                                    |
| <b>4. Week</b>  | Luminescence mechanism and general features           |
| <b>5. Week</b>  | Principles and methods of thermoluminescence          |
| <b>6. Week</b>  | Principles and methods of thermoluminescence          |
| <b>7. Week</b>  | Midterm exam                                          |
| <b>8. Week</b>  | Characteristics of thermoluminescence matters         |
| <b>9. Week</b>  | Characteristics of thermoluminescence matters         |
| <b>10. Week</b> | Thermoluminescence dosimetry readers                  |
| <b>11. Week</b> | Clinical applications of thermoluminescence dosimetry |
| <b>12. Week</b> | Photon, alpha and beta dosimeters                     |
| <b>13. Week</b> | Personnel and area dosimeters                         |
| <b>14. Week</b> | Characteristics of personnel and area dosimeters      |
| <b>15. Week</b> | Measurement uncertainties                             |
| <b>16. Week</b> | Measurement uncertainties                             |