

**ABDULLAH GUL UNIVERSITY
GRADUATE SCHOOL OF ENGINEERING & SCIENCE
BIOENGINEERING DEPARTMENT
COURSE DESCRIPTION AND SYLLABUS**

| Course Name | CODE | SEMESTER | T+L Hour | CREDIT | ECST |
|-----------------------|------|-------------|----------|--------|------|
| Instrumental Analysis | 525 | FALL-SPRING | 3 + 0 | 3 | 7,5 |

Prerequisite Courses

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| | |
|---------------------------|--|
| Course Type | Elective |
| Course Language | English |
| Course Coordinator | Asst. Prof. Dr. İsmail Alper İšoğlu |
| Lecturers | Dr. İsmail Alper İšoğlu, Dr. Sevil Dincer İšoğlu, Dr. Erkin Aydın, Dr. Aysun Aydın, Dr. Aysun Adan, Dr. Mona El-Khatib, Dr. Sebiha Ç. Kaplan |
| Course Assistants | Res. Asst. Yağmur Kiraz |
| Course Objectives | General introduction about devices that are used in chemical analysis. |
| Learning Outcomes | Students, <ul style="list-style-type: none"> • Able to understand devices that are used in chemical analysis • Able to learn principles of chemical measurements • Able to gain a different point of view on solving problems based on devices • |
| Course Content | Separation methods, Chromatographic techniques, spectrophotometric analysis, spectroscopy types |

WEEKLY SUBJECTS AND RELATED PRELIMINARY PAGES

| Week | Subjects | Preliminary |
|------|---|---|
| 1 | Introduction, chemical analysis and the role of devices | Course book, Introduction part and related articles |
| 2 | Separation methods | Course book, Introduction part and related articles |
| 3 | Chromatographic techniques: HPLC | Course book, Introduction part and related articles |
| 4 | Chromatographic techniques: LC, GPC | Course book, Introduction part and related articles |
| 5 | Spectroscopy: mass spectroscopy | Course book, Introduction part and related articles |
| 6 | Spectroscopy: IR spectroscopy | Course book, part A and related articles |
| 7 | Spectroscopy: NMR spectroscopy | Course book, part B and related articles |
| 8 | Spectroscopy: atomic absorption spectroscopy | Course book, part H,I and related articles |
| 9 | Fluorescence and raman spectroscopy | Related articles |
| 10 | Midterm | Course notes and book |
| 11 | X-ray spectroscopy,ESCA | Course book, part N and related articles |
| 12 | Visualization methods: Optical microscopy | Course book, part N and related articles |
| 13 | Visualization methods:SEM | Course book, part Q and related articles |
| 14 | Visualization methods:AFM | Related articles |
| 15 | Sensors: QCM, SPR | Related articles |
| 16 | Final | Course notes and book |

RESOURCES

| | |
|------------------------|--|
| Course Notes | Related course notes and slides |
| Other Resources | D.A. Skoog, F.J. Holler and S.R. Crouch, Principles of Instrumental Analysis, 6th Edition, Thomson Brooks/Cole Publishers, 2007. |

| MATERIAL SHARING | |
|-------------------------|--|
| Documents | Related course notes and slides |
| Homework | One assignment about related chapter of this course per week |
| Exams | One midterm and one final |

| RATING SYSTEM | | |
|---------------------------------|---------------|---------------------|
| SEMESTER WORKS | NUMBER | CONTRIBUTION |
| Midterm | 1 | 20 |
| Homework and quiz | 14 | 25 |
| TOTAL | | 70 |
| Success Rate of Semester | | 70 |
| Success Rate of Final | 1 | 30 |
| TOTAL | | 100 |

| Course Category | |
|--------------------------------|-----|
| Basic Sciences and Mathematics | 50% |
| Engineering Sciences | 50% |
| Social Sciences | 0% |

| THE RELATIONSHIP BETWEEN THE LEARNING OUTCOMES AND PROGRAM COMPETENCE | | | | | | |
|--|---|--------------------|---|---|---|---|
| | | Contribution Level | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| No Program Outcomes | | | | | | |
| 1 | Understanding of Life Sciences, Mathematics and Engineering at the post-graduate level, and being able to implement of this knowledge into bioengineering problems | | | | | x |
| 2 | Having the ability of developing a new scientific method or a technological product or process, and, designing experiments, implementing, collecting data and evaluating regarding these issues | | | | | x |
| 3 | Choosing technical equipment used in the applications related to bioengineering, having sufficient knowledge in adopting and using new technological equipment | | | | | x |
| 4 | Having the ability of reaching the information, using resources, contributing to the literature by transferring the process and results of scientific studies as written or verbally in the national and international environments | | | | | x |
| 5 | Having the ability of working as an individual or a team, in the teams composed of discipline or different disciplines, gaining awareness of leadership and taking responsibility | | | | x | |
| 6 | Having advanced level of foreign language knowledge to manage efficient verbal, written and visual communication in the major field | | | | x | |
| 7 | Having the understanding of ethics in science and the responsibility in profession with the awareness of lifelong learning, being beneficial to society and sensitiveness to global issues | | | | x | |
| 8 | Being aware of the social impacts of the solutions and applications of the challenges regarding Bioengineering | | | | x | |

*From 1 to 5, it increasingly goes.

| ECTS / WORK-LOAD TABLE | | | |
|--|------------|-----------------|-------------------|
| Activities | Activities | Duration (Hour) | Total (Work-Load) |
| Course Duration (Including exam week: 16x total course hour) | 16 | 3 | 48 |
| Out of Class Exercise Time (Pre-study, reinforcement) | 16 | 7 | 112 |
| Reading | 16 | 3 | 48 |
| Searching on Internet, library study | 5 | 3 | 15 |
| Presentation | 5 | 3 | 15 |
| Homework | 16 | 3 | 48 |
| Midterms | 1 | 15 | 15 |
| Final | 1 | 15 | 15 |
| Total Work-Load | | | 301 |
| Total Work-Load / 30 | | | 301/30 |
| Course ECTS Credit | | | 7,5 |

