# AYDIN ADNAN MENDERES UNIVERSITY
# COURSE INFORMATION FORM

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Course Title | Introduction to General Relativity | | | | | | | | |
| Course Code | FZK612 | | Couse Level | Third Cycle (Doctorate Degree) | | | | | |
| ECTS Credit | 7 | Workload | 175 *(Hours)* | Theory | 3 | Practice | 0 | Laboratory | 0 |
| Objectives of the Course | To teach the general relativity | | | | | | | | |
| Course Content | Review of Special Relativity,  To learn physics in Curved Space Time, To learn Einstein Field Equations | | | | | | | | |
| Work Placement | N/A | | | | | | | | |
| Planned Learning Activities and Teaching Methods | Explanation (Presentation), Discussion, Individual Study, Problem Solving | | | | | | | | |
| Name of Lecturer(s) | | | | | | | | | |

| Assessment Methods and Criteria | | |
|---|---|---|
| Method | Quantity | Percentage (%) |
| Midterm Examination | 1 | 20 |
| Final Examination | 1 | 30 |
| Quiz | 2 | 8 |
| Attending Lectures | 14 | 28 |
| Assignment | 14 | 14 |

| Recommended or Required Reading | |
|---|---|
| 1 | A First Course in General Relativity Bernard Schutz London 2009 |
| 2 | Introducing  Einstein’s Relativity,  Ray D’ Inverno NewYork 1992 |
| 3 | Gravity, James,  B. Hartle , Wesley 2003 |

| Week | Weekly Detailed Course Contents | |
|---|---|---|
| 1 | Theoretical | The Review of the Special Relativity |
| 2 | Theoretical | Vector Analysis in Special relativity 1 |
| 3 | Theoretical | Vector Analysis in Special relativity 2 |
| 4 | Theoretical | Tensor Analysis in Special relativity 1 |
| 5 | Theoretical | Tensor Analysis in Special relativity 2 |
| 6 | Theoretical | Perfect Fluids in Special Relativity |
| 7 | Theoretical | Curvature |
| 8 | Theoretical | Curved Manifolds |
| 9 | Theoretical | Physics in Curved Space Time 1 |
| 10 | Theoretical | Physics in Curved Space Time 2 |
| 11 | Theoretical | Einstein Field Equations 1 |
| 12 | Theoretical | Einstein Field Equations 2 |
| 13 | Theoretical | Gravitational radiation |
| 14 | Theoretical | Spherical symmetric solutions of the Einstein Field Equations |
| 15 | Final Exam | Final exam |

| Workload Calculation | | | | |
|---|---|---|---|---|
| Activity | Quantity | Preparation | Duration | Total Workload |
| Lecture - Theory | 14 | 4 | 3 | 98 |
| Assignment | 12 | 3 | 1 | 48 |
| Quiz | 3 | 2 | 1 | 9 |
| Midterm Examination | 1 | 7 | 3 | 10 |

| | | | | |
|---|---|---|---|---|
| Final Examination | 1 | 7 | 3 | 10 |
| | | | Total Workload (Hours) | 175 |
| | | | [Total Workload (Hours) / 25*] = **ECTS** | 7 |
| **25 hour workload is accepted as 1 ECTS* | | | | |

| **Learning Outcomes** | |
|---|---|
| 1 | To be able to know basic assumptions of Special Relativity and its physical consequences |
| 2 | To be able to explain the manifold concept |
| 3 | To be able to know the Einstein Field Equations and their meanings |
| 4 | Gravitational radiation |
| 5 | To be able to compare the classical and relativistic space-time concepts |

| **Programme Outcomes** *(Physics Doctorate)* | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |

**Contribution of Learning Outcomes to Programme Outcomes** *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

| | L1 | L2 | L3 | L4 | L5 |
|---|---|---|---|---|---|
| P1 | 5 | 4 | 5 | 5 | 5 |
| P2 | 5 | 5 | 5 | 4 | 5 |
| P3 | 5 | 4 | 5 | 5 | 5 |
| P4 | 4 | 4 | 4 | 4 | 4 |
| P5 | 3 | 3 | 3 | 3 | 3 |
| P6 | 4 | 4 | 4 | 4 | 4 |
| P7 | 2 | 2 | 2 | 3 | 2 |
| P8 | 5 | 3 | 3 | 3 | 4 |