| COURSE INFORMATON | | | | | |
|---|---|---|---|---|---|
| **Course Title** | ***Code*** | ***Semester*** | ***L+P Hour*** | ***Credits*** | ***ECTS*** |
| Research Methods | PHYS 514 | 2 | 3 + 0 | 3 | 10 |

| | |
|---|---|
| **Prerequisites** | NONE |

| | |
|---|---|
| **Language of Instruction** | English |
| **Course Level** | MSc and PhD Degrees |
| **Course Type** | Compulsory |
| **Course Coordinator** | |
| **Instructors** | |
| **Assistants** | NONE |
| **Internship** | NONE |
| **Goals** | To introduce research as an integral part of professional practice. thus as a way of thinking |
| **Content** | Scientific statements, formulating a research problem, collecting data, measurement, signal processing, the scientific method, mathematical models, research design, uncertainty, probability and statistics in research, probability theories, Bayes' theorem, ethics and responsibility in scientific research, writing a research proposal |

| Course Learning Outcomes | Program Learning Outcomes | Teaching Methods | Assessment Methods |
|---|---|---|---|
| 1) Gains an insight into research as a way of thinking and an integral part of professional practice | 1 | 1,2 | A |
| 2) Perceives that research is an eight-step process and can conduct a plan of study and write a research proposal accordingly | 5,1,6 | 1,2,4 | A,C |
| 3) Can clearly identify inductive and deductive scientific statements and is capable of utilising them to write a research report | 2,10 | 1,2,4 | A,C |
| 4) Is capable of formulating a research report using a literature review to develop a draft, write about variables, list references and bibliography. | 2,5,6 | 1,4 | A,C |
| 5) Is able to construct a hypothesis and formulate a research proposal accordingly | 5 | 1,4 | C |
| 6) gains an understanding of how to improve research methodology and broaden their research base | 6,10 | 1,4 | A |
| 7)Is able to differentiate between data collection methods and major approaches to information gathering | 7 | 1,2,4 | A,C |
| 8) Is capable of considering ethical issues concerning (participants, confidentiality, information usage, method, and sponsoring organisations) | 9 | 1,2 | A |
| 9) Gains skills in writing research proposals | 8 | 1,4 | C |

| | |
|---|---|
| **Teaching Methods:** | 1: Lecture, 2: Question-Answer, 3: Laboratory, 4: Case-study |
| **Assessment Methods:** | A: Testing, B: Experiment, C: Homework, D: Project |

| COURSE CONTENT | | |
|---|---|---|
| **Week** | **Topics** | **Study Materials** |
| 1 | Scientific statements: justification and acceptance,<br><br>Deductive &Inductive reasoning, Falsification, Peer review | Textbook |
| 2 | Formulating a research problem: Basic research, Applied research, Evaluation research, Reviewing literature, Formulating a research problem, Identify variables, hypothesis construction | Textbook |
| 3 | Collecting data: selecting a method, establishing validity and reliability of a research instrument, selecting a sample, ethical issues in data collection | Textbook |
| 4 | Measurement: Measurement errors, Significant digits and rounding, Potential sources of error, Random and systematic errors, When to discard a measurement | Textbook |
| 5 | Signal processing: Electronics, Interfacing, Instrumentation | Textbook |
| 6 | Processing and displaying data | Textbook |
| 7 | The scientific method and implementation into research: Observation, Hypothesis, Experimental testing, Predictions | Textbook |
| 8 | Mathematical models: Empirical versus deterministic models | Textbook |
| 9-10 | Research design: Components, Research design and your proposal, Checklists to assist you in preparing dissertation and thesis proposals | Textbook |
| 11-12 | Uncertainty, probability and statistics in research: Probability concepts,(Probability theories and axioms, Bayes' theorem), Inductive logic and statistics | Textbook |
| 13 | Ethics and responsibility in scientific research | Textbook |
| 14 | Further Suggestions<br><br>What else is needed to complete a thesis | Textbook |
| 15 | Writing a research proposal | Textbook |
| 16 | FINAL EXAM | Textbook |

| RECOMMENDED SOURCES | |
|---|---|
| **Textbook** | 1. Research Methodology: A Step-by-Step Guide for Beginners Paperback , 4th edn, 14 Jan 2014, Ranjit Kumar<br>2. Research Methodology: The Aims, Practices and ethics of science, Peter Pruzan |
| **Additional Resources** | Explorable website – www.explorable.com |

| MATERIAL SHARING | |
|---|---|
| **Documents** | Handouts |
| **Assignments** | Assignments every other week |
| **Exams** | 1 Final |

| ASSESSMENT | | |
|---|---|---|
| **IN-TERM STUDIES** | **NUMBER** | **PERCENTAGE** |
| Mid-term exam | 2 | 30 |
| Experiment | 0 | 0 |
| Assignment | 6 | 10 |
| **Total** | | **40** |
| **CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE** | | 60 |
| **CONTRIBUTION OF IN-TERM TRAINING TO OVERALL GRADE** | | 40 |
| **Total** | | **100** |

| COURSE'S CONTRIBUTION TO PROGRAM | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Program Learning Outcomes | Contribution | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | |
| 1 | Gets a sound base for the main fields of physics such as Classical Mechanics, Quantum Mechanics and Electromagnetism, | X | | | | | |
| 2 | Gets the ability of interpreting, analysing, forming a synthesis and relationships between the main fields of physics and/or other sciences, | | | | | X | |
| 3 | Obtains the education required for the measurements in scientific and technological areas and the contribution of physics in the industrial applications and on the macroscopic scale such as the society, | | | | | X | |
| 4 | Follows the up-to-date scientific developments, makes the analysis/synthesis for the new ideas and evaluates them, | | | | | X | |
| 5 | Uses the academic sources, the computer technology and the related devices, | | | X | | | |
| 6 | Joins the working and research groups, also the scientific meetings, communicates well at the national and international level, | | X | | | | |
| 7 | Gets the ability of creative and critical thinking, problem solving, researching, producing a new and original work, improving himself/herself in his/her own fields of interest, | | | | | X | |
| 8 | Gains the concepts of ethics and responsibility. Undertakes the responsibility for the solutions to the problems related with his/her field as required for having an intellectual identity. | | | | | X | |

| **COURSE CATEGORY** | | | Field Courses |
|---|---|---|---|
| **ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION** | | | |
| Activities | Quantity | Duration (Hour) | Total Workload (Hour) |
| Course Duration (Excluding the exam weeks: 14x Total course hours) | 14 | 3 | 42 |
| Hours for off-the-classroom study (Pre-study, practice) | 14 | 10 | 140 |
| Mid-term examination | 2 | 2 | 4 |
| Experiment | 0 | 0 | 0 |
| Homework | 6 | 10 | 60 |
| Project | 0 | 0 | 0 |
| Final examination | 1 | 3 | 3 |
| **Total Work Load** | | | 249 |
| **Total Work Load / 25 (h)** | | | 9.96 |
| **ECTS Credit of the Course** | | | 10 |

| COURSE INFORMATON | | | | | |
|---|---|---|---|---|---|
| **Course Title** | *Code* | *Semester* | *L+P Hour* | *Credits* | *ECTS* |
| STATISTICAL PHYSICS & THERMODYNAMICS | PHYS541 | 1 | 3 + 0+0 | 3 | 10 |

| | |
|---|---|
| **Prerequisites** | |

| | |
|---|---|
| **Language of Instruction** | English |
| **Course Level** | Postgraduate |
| **Course Type** | Compulsory |
| **Course Coordinator** | Prof. Dr. Necdet Aslan |
| **Instructors** | |
| **Assistants** | |
| **Goals** | |
| **Content** | |

| **Learning Outcomes** | **Teaching Methods** | **Assessment Methods** |
|---|---|---|
| 1) Fundamentals of statistics | 1,2 | A,B,C |
| 2) Fundamentals of thermodynamics | 1,2 | A,B,C |
| 3) Quantum statistics | 1,2 | A,B,C |
| 4) Kinetic theory of gases | 1,2 | A,B,C |
| 5) Magnetism and properties | 1,2 | A,B,C |
| 6) Thermodynamics cycles | 1,2 | A,B,C |

| | |
|---|---|
| **Teaching Methods:** | 1: Lecture, 2: Question-Answer |
| **Assessment Methods:** | A: Testing, B:Course project, C: Homework |

| COURSE CONTENT | | |
|---|---|---|
| **Week** | **Topics** | **Study Materials** |
| 1 | INTRODUCTION | |
| 2 | DISTRIBUTION FUNCTIONS | Distributions |
| 3 | INTERACTION AMONGST MACROSCOPIC SYSTEMS | Partition function |
| 4 | THERMODYNAMICS LAWS | 0. law |
| 5 | APPLICATIONS OF THERMODYNAMICS | 1. & 2. law |
| 6 | STATISTICAL THERMODYNAMICS | |
| 7 | APPLICATIONS OF STATISTICAL THERMODYNAMICS | |
| 8 | ADVANCED QUANTUM STATISTICS | Microscopic systems |
| 9 | ADVANCED MAGNETISM APPLICATIONS | |
| 10 | FERRO-PARA-DIA MAGNETISM DEFINITIONS | magnetism |
| 11 | ADVANCED GASES KINETIC THEORY | gases |
| 12 | FUNDAMENTALS OF PLASMA PHYSICS | plasma |
| 13 | THERMODYNAMICS CYCLES | |
| 14 | THERMODYNAMICS CYCLES APPLICATIONS AND TECHNOLOGY | |

| RECOMMENDED SOURCES | |
|---|---|
| **Textbook** | **Introduction to Plasma Physics and Controlled Fusion** |
| **Additional Resources** | |

| MATERIAL SHARING | |
|---|---|
| **Documents** | |
| **Assignments** | 10 homeworks |
| **Exams** | 1 midterm, 1 final |

| ASSESSMENT | | |
|---|---|---|
| **IN-TERM STUDIES** | **NUMBER** | **PERCENTAGE** |
| Mid-term | 1 | 30 |
| Homework | 2 | 20 |
| Final | 1 | 50 |
| **Total** | | **100** |
| **CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE** | | 50 |
| **CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE** | | 50 |
| **Total** | | **100** |

| | |
|---|---|
| **COURSE CATEGORY** | Expertise/Field Courses |

| COURSE'S CONTRIBUTION TO PROGRAM | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Program Learning Outcomes | Contribution | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | |
| 1 | Gets a sound base for the main fields of physics such as Classical Mechanics, Quantum Mechanics and Electromagnetism, | | | | | X | |
| 2 | Gets the ability of interpreting, analysing, forming a synthesis and relationships between the main fields of physics and/or other sciences, | | | | | X | |
| 3 | Obtains the education required for the measurements in scientific and technological areas and the contribution of physics in the industrial applications and on the macroscopic scale such as the society, | | | | X | | |
| 4 | Follows the up-to-date scientific developments, makes the analysis/synthesis for the new ideas and evaluates them, | | | | X | | |
| 5 | Uses the academic sources, the computer technology and the related devices, | | X | | | | |
| 6 | Joins the working and research groups, also the scientific meetings, communicates well at the national and international level, | | X | | | | |
| 7 | Gets the ability of creative and critical thinking, problem solving, researching, producing a new and original work, improving himself/herself in his/her own fields of interest, | | | | | X | |
| 8 | Gains the concepts of ethics and responsibility. Undertakes the responsibility for the solutions to the problems related with his/her field as required for having an intellectual identity. | | X | | | | |

| ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION | | | |
|---|---|---|---|
| Activities | Quantity | Duration (Hour) | Total Workload (Hour) |
| Course Duration (Excluding the exam week: 14x Total course hours) | 14 | 3 | 48 |
| Hours for off-the-classroom study (Pre-study, practice) | 14 | 12 | 168 |
| Mid-terms | 1 | 3 | 3 |
| Assignment | 2 | 12 | 24 |
| Final examination | 1 | 3 | 3 |
| **Total Work Load** | | | 246 |
| **Total Work Load / 25 (h)** | | | 9.84 |
| **ECTS Credit of the Course** | | | 10 |

| COURSE INFORMATION | | | | | |
|---|---|---|---|---|---|
| **Course Title** | *Code* | *Semester* | *L+P Hour* | *Credits* | *ECTS* |
| MATHEMATICAL METHODS AND CLASSICAL MECHANICS | PHYS 561 | 1 | 3 + 1 | 3 | 10 |

| | |
|---|---|
| **Prerequisites** | - |

| | |
|---|---|
| **Language of Instruction** | English |
| **Course Level** | Graduate |
| **Course Type** | Compulsory (Theory Option) |
| **Course Coordinator** | Prof. Dr. Avadis Hacinliyan |
| **Instructors** | Prof. Dr. Avadis Hacinliyan |
| **Assistants** | |
| **Goals** | Introducing mathematical methods of physics such as vector and tensor analysis, linear algebra, Laplace and Poisson Equations. Introducing the physical and mathematical basis of classical mechanics, analytical mechanics, symmetry and invariance principles. Studying Lagrangian and Hamiltonian formulations, canonical transformations, Poisson brackets, Hamilton Jacobi theory, perturbation theory. Investigating problems that can be exactly or approximately solved. |
| **Content** | Scalars, vectors and tensors, generalized coordinates, Linear algebra review. Lagrange’s Equations. Divergence, curl, Gauss's and Stokes's theorems. Particles and systems of particles. Symmetries and conservation laws Hamilton’s principle and Lagrange’s equations. Constrained systems. Small oscillations. Two body central force problem. Classical scattering theory. Rotating coordinate systems. Centrifugal and Coriolis forces. Solvable problems in rigid body mechanics. Legendre transformations. Hamilton’s canonical equations. Canonical Transformations. Poisson Brackets. Hamilton Jacobi Theory. Action Angle Variables. |

| Learning Outcomes | Teaching Methods | Assessment Methods |
|---|---|---|
| 1) Create the physical and mathematical background that the student will need in the graduate level. | 1,2,3 | A,B,C |
| 2) Lay the mathematical and mechanical foundation for problems that the student will encounter in graduate studies. | 1,2,3 | A,B,C |
| 3) Skill to apply knowledge in physics and mathematics Motivation And Behavior | 1,2,3 | A,B |
| 4) Teach basic mathematical methods and variational principles and the Lagrange, Hamilton, Hamilton Jacobi and Poisson formulations. | 1,2,3 | A,B |
| 5) Exact and approximate computation methods | 1,2,3 | A,B,C |
| 6) Skill to define, formulate and solve physical problems. | 1,2,3 | A,B,C |
| 7) Skill to use the techniques and means necessary for physics applications. | 1,2,3 | A,B,C |

| | |
|---|---|
| **Teaching Methods:** | 1: Lecture, 2: Problem Sets, 3: Presentations |
| **Assessment Methods:** | A: Examination, B: Homework C: Presentation |

| COURSE CONTENT | | |
|---|---|---|
| **Week** | **Topics** | **Study Materials** |
| 1 | Vector and scalar fields | Math Methods. |
| 2 | Orthogonal and generalized coordinate systems. Lagrange equations. | Math. Meth. İn Physics |
| 3 | Permutation symbols. Tensors. Flux, divergence and Gauss' theorem. | Math Meth. in Phys. |
| 4 | Curl and Stokes' Theorem. Classical gravitational theory. | Math. Meth. in Phys.. |
| 5 | Laplace and Poisson Equations. Potential Theory. | Electromagnetic Theory. |
| 6 | Systems of particles, Principles of mechanics and conservation laws. | Classical Mechanics |
| 7 | Midterm Exam | |
| 8 | Hamilton's principle, Calculus of variations and Lagrange's Equations. Symmetry and conservation principles. First Integrals. | Classical Mechanics. |
| 9 | Eigenvalues and Eigenvectors. Small oscillations. Normal frequencies and coordinates | Linear algebra. Math. Methods |
| 10 | Two body central force problem. Classical scattering theory. | |

| | | |
|---|---|---|
| 11 | Orthogonal transformations, Rotating coordinate systems. Centrifugal and Coriolis forces. | Classical Mechanics. |
| 12 | Solvable problems in rigid body mechanics. Top problem. | Classical Mechanics. |
| 13 | Legendre Transformations, Hamilton's canonical equations, Canonical transformations | Math. Meth. Phys. |
| 14 | Poisson Brackets, Hamilton Jacobi Theory | Classical Mechanics |
| 15 | General Revision and Midterm Exam | |

| RECOMMENDED SOURCES | |
|---|---|
| **Textbook** | H. Goldstein, C. P. Poole Jr., J. L. Safko, Classical Mechanics (3. Baskı), Addison Wesley ve Pearson Education (2002). ; Hans J. Weber, Frank Harris, George B. Arfken] Essential Mathematical Methods for Physicists, Academic Press.<br>G. Stephenson and P. M. Radmore "Advanced Mathematical Methods for Engineering and Science Students, Cambridge University Press |
| **Additional Resources** | C. Lanczos, The Variational Principles of Mechanics (2. Edition) Dover (1970)<br>F. Scheck: Mechanics from Newton's Laws to Deterministic Chaos 5. Edition, Springer (2010) |

| MATERIAL SHARING | |
|---|---|
| **Documents** | Ahmed Yüksel Özemre, "(Math. Meth. Phys.) Fizikte Matematiksel Metotlar" and "(Classical Theoretical Mechanics) Klasik Teorik Mekanik" İstanbul University Publication (1998) |
| **Assignments** | From Textbook |
| **Exams** | |

**COURSE'S CONTRIBUTION TO PROGRAM**

| No | Program Learning Outcomes | Contribution | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1 | Gets a sound base for the main fields of physics such as Classical Mechanics, Quantum Mechanics and Electromagnetism, | | | | | X |
| 2 | Gets the ability of interpreting, analysing, forming a synthesis and relationships between the main fields of physics and/or other sciences, | | | | | X |
| 3 | Obtains the education required for the measurements in scientific and technological areas and the contribution of physics in the industrial applications and on the macroscopic scale such as the society, | | | | X | |
| 4 | Follows the up-to-date scientific developments, makes the analysis/synthesis for the new ideas and evaluates them, | | | | X | |
| 5 | Uses the academic sources, the computer technology and the related devices, | | X | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 6 | Joins the working and research groups, also the scientific meetings, communicates well at the national and international level, | | X | | | |
| 7 | Gets the ability of creative and critical thinking, problem solving, researching, producing a new and original work, improving himself/herself in his/her own fields of interest, | | | | | X |
| 8 | Gains the concepts of ethics and responsibility. Undertakes the responsibility for the solutions to the problems related with his/her field as required for having an intellectual identity. | | X | | | |

| **ASSESSMENT** | | |
|---|---|---|
| **IN-TERM STUDIES** | **NUMBER** | **PERCENTAGE** |
| Mid-terms | 2 | 80 |
| Quizzes | 4 | 10 |
| Assignment | 8 | 10 |
| **Total** | | **100** |
| **CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE** | | 40 |
| **CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE** | | 60 |
| **Total** | | **100** |

| | |
|---|---|
| **COURSE CATEGORY** | Expertise/Field Courses |

| **ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION** | | | |
|---|---|---|---|
| Activities | Quantity | Duration (Hour) | Total Workload (Hour) |
| Course Duration (Including the exam week: 16x Total course hours) | 16 | 4 | 64 |
| Hours for off-the-classroom study (Pre-study, practice) | 16 | 5 | 80 |
| Mid-terms | 2 | 10 | 20 |
| Quizzes | 4 | 1 | 4 |
| Homework | 8 | 3 | 24 |
| Problem Hour and Presentation (Preparation included) | 5 | 8 | 40 |
| Final examination (Reparation Exam included) | 2 | 10 | 20 |
| **Total Work Load** | | | 252 |

| | | | |
|---|---|---|---|
| **Total Work Load / 25 (h)** | | | 10 |
| **ECTS Credit of the Course** | | | 10 |

| COURSE INFORMATON | | | | | |
|---|---|---|---|---|---|
| **Course Title** | *Code* | *Semester* | *L+P Hour* | *Credits* | *ECTS* |
| QUANTUM MECHANICS I | PHYS 521 | 1 | 4 + 0 | 4 | 10 |

| | |
|---|---|
| **Prerequisites** | - |

| | |
|---|---|
| **Language of Instruction** | English |
| **Course Level** | Graduate |
| **Course Type** | Compulsory (Theory Option) |
| **Course Coordinator** | Prof. Dr. Avadis Hacinliyan |
| **Instructors** | Prof. Dr. Avadis Hacinliyan |
| **Assistants** | |
| **Goals** | The aim of this course is to teach the physical principles and interpretation of quantum mechanics and the mathematical principles on which they rest. Calculational techniques will also be emphasized. |
| **Content** | Principles of wave mechanics, Schroedinger equation, Eigenvalues and eigenstates, angular momentum, matrices in quantum mechanics, Symmetry, Approximation methods, Scattering. |

| **Learning Outcomes** | **Teaching Methods** | **Assessment Methods** |
|---|---|---|
| 1) Introduces the mathematical foundations of quantum mechanics (Differential equations, Vectors and Matrices, Fourier Analysis) | 1,2,3 | A,B,C |
| 2) Explain the physical principles of quantum mechanics (Classical Mechanics, Correspondance and Uncertainity principles). Introduces scientific and technological applications. | 1,2,3 | A,B,C |
| 3) Develops skills to apply knowledge of physics and mathematics. | 1,2,3 | A,B |
| 4) Design and perform experiments(measurement, research setup etc.), develop ability to analyze and interpret experimental results. | 1,2,3 | A,B |
| 5) Introduces exact and approximate calculation methods. | 1,2,3 | A,B |

| | | |
|---|---|---|
| 6) Develop skill to define formulate and solve physics problems. | 1,2,3 | A,B |
| 7) Develop skill to apply techniques and devices necessary for physical applications | 1,2,3 | A,B,C |

| | |
|---|---|
| **Teaching Methods:** | 1: Lecture, 2: Problkem Sets 3: Problem Session |
| **Assessment Methods:** | A: Examination B: Homework C: Presentation |

| **COURSE CONTENT** | | |
|---|---|---|
| **Week** | Topics | **Study Materials** |
| 1 | MATHEMATICAL AND PHYSICAL FOUNDATIONS OF QUANTUM MECHANICS | Modern Physics, Math Methods of Physics |
| 2 | SCHRÖDINGER WAVE EQUATION, WAVE FUNCTION | Modern Physics, |
| 3 | EIGENVALUE AND EIGENVECTORS, EXPANSION POSTULATE, INTERPRETATION AND APPLICATIONS. STRUCTURE OF QUANTUM MECHANICS | Math Methods of Physics Sturm Liouville Theory |
| 4 | BOUND AND SCATTERING STATE PROBLEMS IN ONE DIMENSION | Differential Equations, Probability |
| 5 | OPERATORS, SYMMETRY AND CONSERVATION LAWS | Classical Mechanics |
| 6 | PROBLEMS IN MORE THAN ONE DIMENSION, SEPARATION OF VARIABLES, MANY PARTICLE WAVE FUNCTIONS | Math. Methods in Physics |
| 7 | MIDTERM EXAM | |
| 8 | MATRIX MECHANICS, ANGULAR MOMENTUM PROBLEM | Linear Algebra |
| 9 | PROBLEMS WITH SPHERICAL SYMMETRY. THE HYDROGEN ATOM | Math. Methods in Physics |
| 10 | SPİN AND IDENTICAL PARTICLES | Angular Momentum Operators |
| 11 | PERTURBATION THEORY | Math. Methods in Physics |
| 12 | VARIATIONAL AND OTHER APPROXIMATION METHODS. TIME DEPENDENT PERTURBATION THEORY. | Math. Meth in Physics |
| 13 | SCATTERING THEORY | Math. Meth in Physics |

| | | |
|---|---|---|
| 14 | REVIEW AND MIDTERM EXAMINATION | |

| RECOMMENDED SOURCES | |
|---|---|
| **Textbook** | E.Merzbacher Quantum Mechanics (3. Edition). Wiley,1998 |
| **Additional Resources** | R: Shankar Principles of Quantum Mechanics, (2. Edition) Springer (1994)<br>L.D.Landau and E. M. Liftshitz Quantum Mechanics. Non-relativistic theory (3. Edition) Butterworth Heinemann (1981) |

| MATERIAL SHARING | |
|---|---|
| **Documents** | "Quantum Mechanics Demystified" David McMahan, Schaum's Outline of Theory and Problems of Quantum Mechanics" by Y. Peleg, R. Pnini, E. Zaarur |
| **Assignments** | From the textbook |
| **Exams** | |

| ASSESSMENT | | |
|---|---|---|
| **IN-TERM STUDIES** | **NUMBER** | **PERCENTAGE** |
| Mid-terms | 2 | 80 |
| Quizzes | 4 | 10 |
| Assignment | 8 | 10 |
| **Total** | | **100** |
| **CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE** | | 40 |
| **CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE** | | 60 |
| **Total** | | **100** |

| COURSE'S CONTRIBUTION TO PROGRAM | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Program Learning Outcomes | Contribution | | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 1 | Gets a sound base for the main fields of physics such as Classical Mechanics, Quantum Mechanics and Electromagnetism, | | | | | X |
| 2 | Gets the ability of interpreting, analysing, forming a synthesis and relationships between the main fields of physics and/or other sciences, | | | | | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | Obtains the education required for the measurements in scientific and technological areas and the contribution of physics in the industrial applications and on the macroscopic scale such as the society, | | | | X | |
| 4 | Follows the up-to-date scientific developments, makes the analysis/synthesis for the new ideas and evaluates them, | | | | X | |
| 5 | Uses the academic sources, the computer technology and the related devices, | | X | | | |
| 6 | Joins the working and research groups, also the scientific meetings, communicates well at the national and international level, | | X | | | |
| 7 | Gets the ability of creative and critical thinking, problem solving, researching, producing a new and original work, improving himself/herself in his/her own fields of interest, | | | | | X |
| 8 | Gains the concepts of ethics and responsibility. Undertakes the responsibility for the solutions to the problems related with his/her field as required for having an intellectual identity. | | X | | | |

| | |
|---|---|
| **COURSE CATEGORY** | Expertise/Field Courses |

| **ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION** | | | |
|---|---|---|---|
| Activities | Quantity | Duration (Hour) | Total Workload (Hour) |
| Course Duration (Including the exam week: 16x Total course hours) | 16 | 4 | 64 |
| Hours for off-the-classroom study (Pre-study, practice) | 16 | 5 | 80 |
| Mid-terms | 2 | 10 | 20 |
| Quizzes | 4 | 1 | 4 |
| Ödev | 8 | 3 | 24 |
| Final examination (with reparatıon) | 2 | 10 | 20 |
| **Total Work Load** | | | 252 |
| **Total Work Load / 25 (h)** | | | 10 |
| **ECTS Credit of the Course** | | | 10 |

| COURSE INFORMATION | | | | | |
|---|---|---|---|---|---|
| **Course Title** | *Code* | *Semester* | *L+P Hour* | *Credits* | *ECTS* |
| Introduction To Critical Thinking | PHYS 528 | 2 | 2 + 0 | **2** | **4** |

| | |
|---|---|
| **Prerequisites** | |

| | |
|---|---|
| **Language of Instruction** | English |
| **Course Level** | Postgraduate |
| **Course Type** | Elective |
| **Course Coordinator** | |
| **Instructors** | |
| **Assistant** | |
| **Goals** | To help students distinguish between harmful forms of thought and beneficial forms of thought, to teach students to reason rationally, write sound and effective arguments, behave ethically, and understand how knowledge is gained. |
| **Content** | Critical thinking and its relation to science and humanism, argument mapping, egocentrism and sociocentrism, rational and irrational arguments, logical and formal fallacies, questioning, ethical thinking and the theory of knowledge. |

| **Learning Outcomes** | **Teaching Methods** | **Assessment Methods** |
|---|---|---|
| 1) Human thinking left to itself leads to various forms of self-deception. | 1 ,12 | A |
| 2)Realisation that many types of thinking can be harmful, but more congenial to human nature. | 12 | A |
| 3) To distinguish between scientific thought and nonscientific thought.<br>To recognise egocentrism and sociocentrism as being 'ordinary' thinking. | 2,3,12 | A ,C |
| 4) The role of questioning in critical thinking requires being active in reading, writing, listening and thinking. | 12 | A |
| 5) Development of the skills to map arguments effectively, avoiding logical fallacies. | 1,2,3,12 | A,C |
| 6) To recognise and produce a good argument.<br>To recognise what invalidates an argument and how to repair it. | 1,2,3,12 | A |
| 7) To be familiar with informal fallacies, and their pitfalls | 1,2,3 | A,C |

| | | |
|---|---|---|
| 8) To be aware of tone, balance and bias in texts | 1,2,3,12 | A |
| 9) Obtain understanding of ethical thinking | 1 | A |
| 10) Obtain understanding of Socratic questioning and questions that will lead to good thinking | 1, 2,3 | A,C |
| 11)To practice deep learning of a body of knowledge by organisation, thought and reflection. | 1 | A |

| | |
|---|---|
| **Teaching Methods:** | 1: Lecture, 2: Question-Answer, 3: Discussion, 9: Simulation, 12: Case Study |
| **Assessment Methods:** | A: Testing, C: Homework |

**COURSE CONTENT**

| Week | Topics | Study Materials |
|---|---|---|
| 1 | Components of critical thinking and ordinary thinking, humanism, bigotry and bias | Lectures,1, 2, 4 |
| 2 | Critical thinking in science and socratic questioning | Lectures,1,2 |
| 3 | Argument mapping 1- components of a simple argument, mapping logic | Lectures, 4 |
| 4 | Argument mapping 1-case study 1 | Lectures, 3 |
| 5 | Argument mapping 2-multiple premises, co-premises, the golden rule, the rabbit rule, holding hands rule. Logical fallacies. | Lectures, 3 |
| 6 | Argument mapping 2-case study 2 | Lectures, 3 |
| 7 | Midterm exam 1 | |
| 8 | Egocentrism and sociocentrism as results of ‘ordinary’ thinking | Lectures, 1, 2 |
| 9 | Classifying arguments: case studies, repairing arguments. | Lectures, 3 |
| 10 | Informal fallacies 1: case studies, tone, balance and bias in texts. | Lectures,1, 3 |
| 11 | Informal fallacies 2: case studies, tone, balance and bias in texts. | Lectures, 1,3 |
| 12 | Midterm exam 2 | |
| 13 | Standards for thinking: ethical thinking, Socratic questioning, questions that lead to excellence of thought. | Lectures,1 |
| 14 | The theory of knowledge (TOK) | Lectures, 1 |

**RECOMMENDED SOURCES**

| | |
|---|---|
| **Textbook** | 1. Critical thinking, 3rd edn – R. Paul and L. Elder |
| **Additional Resources** | 2. Think critically- Facione and Gittens, 2013 |

| **MATERIAL SHARING** | |
|---|---|
| **Documents** | 3. Various articles from the media, 4. Developing critical thinking skills, W.T. Daly |
| **Assignments** | Four homework assignments |
| **Exams** | Two mid-term exams and one final |

| **ASSESSMENT** | | |
|---|---|---|
| **IN-TERM STUDIES** | **NUMBER** | **PERCENTAGE** |
| Mid-terms | 2 | 30 |
| Lab practicals | 0 | 0 |
| Assignment | 5 | 10 |
| Seminars | 3 | 10 |
| **Total** | | **50** |
| **CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE** | | 50 |
| **CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE** | | 50 |
| **Total** | | **100** |

| | |
|---|---|
| **COURSE CATEGORY** | Expertise/Field Courses |

| **COURSE CATEGORY** | | Expertise/Field Courses | | | | |
|---|---|---|---|---|---|---|
| No | Program Learning Outcomes | Contribution | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 1 | Gets a sound base for the main fields of physics such as Classical Mechanics, Quantum Mechanics and Electromagnetism, | | X | | | |
| 2 | Gets the ability of interpreting, analysing, forming a synthesis and relationships between the main fields of physics and/or other sciences, | | | | | X |
| 3 | Obtains the education required for the measurements in scientific and technological areas and the contribution of physics in the industrial applications and on the macroscopic scale such as the society, | | | | X | |
| 4 | Follows the up-to-date scientific developments, makes the analysis/synthesis for the new ideas and evaluates them, | | | | | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | Uses the academic sources, the computer technology and the related devices, | | | | | X |
| 6 | Joins the working and research groups, also the scientific meetings, communicates well at the national and international level, | | X | | | |
| 7 | Gets the ability of creative and critical thinking, problem solving, researching, producing a new and original work, improving himself/herself in his/her own fields of interest, | | | | | X |
| 8 | Gains the concepts of ethics and responsibility. Undertakes the responsibility for the solutions to the problems related with his/her field as required for having an intellectual identity. | | | | | X |

| **ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION** | | | |
|---|---|---|---|
| Activities | Quantity | Duration (Hour) | Total Workload (Hour) |
| Course Duration (Including the exam week: 16x Total course hours) | 16 | 2 | 32 |
| Hours for off-the-classroom study (Pre-study, practice) | 16 | 4 | 64 |
| Mid-terms | 2 | 2 | 4 |
| Homework assignments | 5 | 1 | 5 |
| Final examination | 1 | 2 | 2 |
| **Total Work Load** | | | 107 |
| **Total Work Load / 25 (h)** | | | 4.28 |
| **ECTS Credit of the Course** | | | 4 |

| COURSE INFORMATION | | | | | |
|---|---|---|---|---|---|
| **Course Title** | *Code* | *Semester* | *L+P Hour* | *Credits* | *ECTS* |
| ADVANCED METROLOGY | PHYS 542 | 2 | 3+ 0+0 | 3 | 8 |

| | |
|---|---|
| **Prerequisites** | |

| | |
|---|---|
| **Language of Instruction** | English |
| **Course Level** | Postgraduate |
| **Course Type** | Compulsory |
| **Course Coordinator** | |
| **Instructors** | Assist. Prof. Dr. Melda Patan Alper |
| **Assistant** | |
| **Goals** | To provide students with knowledge of how to use physics knowledge in measurements of science. |
| **Content** | Brief history of measurements, measurements instruments; instrumer classification and characteristic, active/passive filter, sensitivity, bias, toleranc etc., Error in measurements, firs and second order instruments, guidelines fc evaluating and expressing uncertainty, Primary, secondary and workir standards, traceability, measurements of electrical quantities; Bridge circuits, Nu type-Wheatstone bridge, deflection bridge etc. temperature measurements; ITS 90 scale, practical temperature measurements etc. |

| **Learning Outcomes** | **Teaching Methods** | **Assessment Methods** |
|---|---|---|
| 1) To learn measurement systems from past to present | 1,2,3 | A,C |
| 2) To learn how to use physics knowledge for physical measurements system | 1,2,3 | A,C |
| 3) To learn the importance of instrument classification and characteristics | 1,2,3 | A,C |
| 4) To understand wide range of measurement techniques in physics, used for industry. | 1,2,3 | A,C |
| 5) To understand the realisation and maintanance of SI base units | 1,2,3 | A,C |

| | |
|---|---|
| **Teaching Methods:** | 1: Lecture, 2: Question-Answer, 3: Discussion, 9: Simulation, 12: Case Study |
| **Assessment Methods:** | A: Testing, C: Homework, I:Laboratory |

| COURSE CONTENT | | |
|---|---|---|
| **Week** | **Topics** | **Study Materials** |
| 1 | History of measurements | |
| 2 | Instrument classification and characteristics | |
| 3 | Instrument classification and characteristics | |
| 4 | Error in measurements system and quide to evaluation of measurement uncertainties | |
| 5 | Error in measurements systems and quide to evaluation of measurement uncertainties | |
| 6 | Primary, Secondary and working metrological standards | |
| 7 | Primary, Secondary and working metrological standards | |
| 8 | Measurements of electrical quantatities | |
| 9 | Bridge circuits, errors in bridge measurement system | |
| 10 | Realisation of national voltage standards, volts | |
| 11 | Realisation of national Ampere standard | |
| 12 | Realisation of national resistance; quantum hall effect | |
| 13 | Temperature measurements; ITS-90 scale | |
| 14 | Practical temperature measurements | |

| RECOMMENDED SOURCES | |
|---|---|
| **Textbook** | 1. G.M.S. de Silva, "Basic Metrology for ISO 9000 Certification<br>2. Alan S. Morris, "Principles of Measurements and Instrumentation" |
| **Additional Resources** | 1. Bernhard Kramer, "The Art of Measurement", PTB, Germany.<br>2. Tom Duncan, "Success in Electronics" |

| MATERIAL SHARING | |
|---|---|
| **Documents** | Lecturer Notes |
| **Assignments** | Homework assignments every three to four weeks |
| **Exams** | Two mid-term exams and one final |

| ASSESSMENT | | |
|---|---|---|
| **IN-TERM STUDIES** | **NUMBER** | **PERCENTAGE** |
| Mid-terms | 2 | 40 |
| Home-works and presentations | 4 | 10 |
| | | |
| **Total** | | |
| **CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE** | | 50 |
| **CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE** | | 50 |
| **Total** | | **100** |

| | |
|---|---|
| **COURSE CATEGORY** | Expertise/Field Courses |

| COURSE'S CONTRIBUTION TO PROGRAM | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Program Learning Outcomes | Contribution | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | |
| 1 | Gets a sound base for the main fields of physics such as Classical Mechanics, Quantum Mechanics and Electromagnetism, | | X | | | | |
| 2 | Gets the ability of interpreting, analysing, forming a synthesis and relationships between the main fields of physics and/or other sciences, | | | X | | | |
| 3 | Obtains the education required for the measurements in scientific and technological areas and the contribution of physics in the industrial applications and on the macroscopic scale such as the society, | | | | | X | |
| 4 | Follows the up-to-date scientific developments, makes the analysis/synthesis for the new ideas and evaluates them, | | | | X | | |
| 5 | Uses the academic sources, the computer technology and the related devices, | | | | X | | |
| 6 | Joins the working and research groups, also the scientific meetings, communicates well at the national and international level, | | X | | | | |
| 7 | Gets the ability of creative and critical thinking, problem solving, researching, producing a new and original work, improving himself/herself in his/her own fields of interest, | | | | | X | |
| 8 | Gains the concepts of ethics and responsibility. Undertakes the responsibility for the solutions to the problems related with his/her field as required for having an intellectual identity. | | X | | | | |

| ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION | | | |
|---|---|---|---|
| Activities | Quantity | Duration (Hour) | Total Workload (Hour) |

| | | | |
|---|---|---|---|
| Course Duration (Excluding the exam week: 14x Total course hours) | 14 | 3 | 42 |
| Hours for off-the-classroom study (Pre-study, practice) | 14 | 8 | 112 |
| Mid-terms | 2 | 3 | 6 |
| Home works and presentations | 4 | 7 | 28 |
| Final examination | 1 | 3 | 3 |
| **Total Work Load** | | | 191 |
| **Total Work Load / 25 (h)** | | | 7.64 |
| **ECTS Credit of the Course** | | | 8 |

| COURSE INFORMATION | | | | | |
|---|---|---|---|---|---|
| **Course Title** | *Code* | *Semester* | *L+P Hour* | *Credits* | *ECTS* |
| MSc Thesis | PHYS 590 | 3 & 4 | | | 30 |

| | |
|---|---|
| **Prerequisites** | - |

| | |
|---|---|
| **Language of Instruction** | English |
| **Course Level** | MSc |
| **Course Type** | Compulsory |
| **Course Coordinator** | |
| **Instructors** | |
| **Assistants** | |
| **Goals** | The aim of this course is to work/study on a project about the fields of physics that the student has learned during the eduation. |
| **Content** | Finalizing the the project, report writing and presentation |

| **Learning Outcomes** | **Teaching Methods** | **Assessment Methods** |
|---|---|---|
| Has the ability to work on a project in physics in experimental or theoretical way. | 1, 2, 3, 11, 16 | D, E, G, H |

| | |
|---|---|
| **Teaching Methods:** | 1: Lecture, 2: Question-Answer, 3: Discussion, 11: Seminar, 16: Oral Exam |
| **Assessment Methods:** | D: Proje, E: Report, G:Presentation, H:Application |

| **RECOMMENDED SOURCES** | |
|---|---|
| **Textbook** | depends on the project |
| **Additional Resources** | |

| **MATERIAL SHARING** | |
|---|---|
| **Documents** | |
| **Assignments** | |
| **Exams** | |

| ASSESSMENT | | |
|---|---|---|
| **IN-TERM STUDIES** | **NUMBER** | **PERCENTAGE** |
| Report | 1 | 85 |
| Presentation | 2 | 15 |
| **Total** | | **100** |
| **CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE** | | 15 |
| **CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE** | | 85 |
| **Total** | | **100** |

| | |
|---|---|
| **COURSE CATEGORY** | Expertise/Field Courses |

| COURSE'S CONTRIBUTION TO PROGRAM | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Program Learning Outcomes | Contribution | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | |
| 1 | Gets a sound base for the main fields of physics such as Classical Mechanics, Quantum Mechanics and Electromagnetism, | | | | | X | |
| 2 | Gets the ability of interpreting, analysing, forming a synthesis and relationships between the main fields of physics and/or other sciences, | | | | | X | |
| 3 | Obtains the education required for the measurements in scientific and technological areas and the contribution of physics in the industrial applications and on the macroscopic scale such as the society, | | | | | X | |
| 4 | Follows the up-to-date scientific developments, makes the analysis/synthesis for the new ideas and evaluates them, | | | | | X | |
| 5 | Uses the academic sources, the computer technology and the related devices, | | | | | X | |
| 6 | Joins the working and research groups, also the scientific meetings, communicates well at the national and international level, | | | | | X | |
| 7 | Gets the ability of creative and critical thinking, problem solving, researching, producing a new and original work, improving himself/herself in his/her own fields of interest, | | | | | X | |
| 8 | Gains the concepts of ethics and responsibility. Undertakes the responsibility for the solutions to the problems related with his/her field as required for having an intellectual identity. | | | | | X | |

| ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION | | | |
|---|---|---|---|
| Activities | Quantity | Duration (Hour) | Total Workload (Hour) |
| Course Duration (Excluding the exam week: 14x Total course hours) | 14 | 3 | 42 |
| Hours for off-the-classroom study (Pre-study, practice) | 14 | 50 | 700 |
| Report | 1 | 3 | 3 |
| Presentation | 1 | 3 | 3 |
| **Total Work Load** | | | 748 |
| **Total Work Load / 25 (h)** | | | 29.92 |
| **ECTS Credit of the Course** | | | 30 |

| COURSE INFORMATION | | | | | |
|---|---|---|---|---|---|
| **Course Title** | *Code* | *Semester* | *L+P Hour* | *Credits* | *ECTS* |
| Seminar | PHYS 580 | 2 | | | 2 |

| | |
|---|---|
| **Prerequisites** | - |

| | |
|---|---|
| **Language of Instruction** | English |
| **Course Level** | MSc |
| **Course Type** | Compulsory |
| **Course Coordinator** | |
| **Instructors** | |
| **Assistants** | |
| **Goals** | The aim of this course is to work/study on a project about the fields of physics that the student has learned during the eduation. |
| **Content** | Report writing and presentation |

| **Learning Outcomes** | **Teaching Methods** | **Assessment Methods** |
|---|---|---|
| Has the ability to work on a topic in physics in experimental or theoretical way. | 1, 2, 3, 11, 16 | D, E, G, H |

| | |
|---|---|
| **Teaching Methods:** | 1: Lecture, 2: Question-Answer, 3: Discussion, 11: Seminar, 16: Oral Exam |
| **Assessment Methods:** | D: Project, E: Report, G:Presentation, H:Application |

| **RECOMMENDED SOURCES** | |
|---|---|
| **Textbook** | depends on the title of the subject |
| **Additional Resources** | |

| **MATERIAL SHARING** | |
|---|---|
| **Documents** | |
| **Assignments** | |
| **Exams** | |

| ASSESSMENT | | |
|---|---|---|
| **IN-TERM STUDIES** | **NUMBER** | **PERCENTAGE** |
| Report | 1 | 55 |
| Presentation | 2 | 45 |
| **Total** | | **100** |
| **CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE** | | 45 |
| **CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE** | | 55 |
| **Total** | | **100** |

| | |
|---|---|
| **COURSE CATEGORY** | Expertise/Field Courses |

| COURSE'S CONTRIBUTION TO PROGRAM | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Program Learning Outcomes | Contribution | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 1 | Gets a sound base for the main fields of physics such as Classical Mechanics, Quantum Mechanics and Electromagnetism, | | | | | X |
| 2 | Gets the ability of interpreting, analysing, forming a synthesis and relationships between the main fields of physics and/or other sciences, | | | | | X |
| 3 | Obtains the education required for the measurements in scientific and technological areas and the contribution of physics in the industrial applications and on the macroscopic scale such as the society, | | | | | X |
| 4 | Follows the up-to-date scientific developments, makes the analysis/synthesis for the new ideas and evaluates them, | | | | | X |
| 5 | Uses the academic sources, the computer technology and the related devices, | | | | | X |
| 6 | Joins the working and research groups, also the scientific meetings, communicates well at the national and international level, | | | | | X |
| 7 | Gets the ability of creative and critical thinking, problem solving, researching, producing a new and original work, improving himself/herself in his/her own fields of interest, | | | | | X |
| 8 | Gains the concepts of ethics and responsibility. Undertakes the responsibility for the solutions to the problems related with his/her field as required for having an intellectual identity. | | | | | X |

| ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION | | | |
|---|---|---|---|
| Activities | Quantity | Duration (Hour) | Total Workload (Hour) |

| | | | |
|---|---|---|---|
| Course Duration (Excluding the exam week: 14x Total course hours) | 14 | 2 | 28 |
| Hours for off-the-classroom study (Pre-study, practice) | 14 | 2 | 28 |
| Report | 1 | 3 | 3 |
| Presentation | 1 | 1 | 1 |
| **Total Work Load** | | | 60 |
| **Total Work Load / 25 (h)** | | | 2.4 |
| **ECTS Credit of the Course** | | | 2 |

| Courses and Program Learning Outcomes | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Physics MSc Program** | | | | | | | | |
| **Courses** | *LO1* | *LO2* | *LO3* | *LO4* | *LO5* | *LO6* | *LO7* | *LO8* |
| Electromagnetism I | 5 | 5 | 4 | 4 | 2 | 2 | 5 | 2 |
| Statistical physics & thermodynamics | 5 | 5 | 4 | 4 | 2 | 2 | 5 | 2 |
| Mathematical methods and classical mechanics | 5 | 5 | 4 | 4 | 2 | 2 | 5 | 2 |
| Quantum Mechanics I | 5 | 5 | 4 | 4 | 2 | 2 | 5 | 2 |
| Advanced Metrology | 5 | 5 | 4 | 4 | 2 | 2 | 5 | 2 |
| Introduction to Critical Thinking | 2 | 2 | 4 | 5 | 5 | 2 | 5 | 5 |
| Seminar | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Thesis | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

**Level of Qualification:**

• Total; Having achieved 7 courses, seminars and thesis, provided that it is 21 credits and not less than 120 ECTS,
• Grade point average must be at least 3.00 out of 4,
• A minimum grade of CC from credit courses.

**Admission to Postgraduate(MSc.) Program:**

• Having a bachelor's degree
• A minimum score of 55 from international foreign language exams accepted as equivalent to foreign language exams or an equivalent score from international foreign language exams accepted as equivalent by ÖSYM,
• Taking at least 55 (numerical) from ALES exam.

## ASSESSMENT AND GRADING

| Percent Age | Course Grade | Grade Points |
|---|---|---|
| 90-100 | AA | 4.00 |
| 85-89 | BA | 3.50 |
| 80-84 | BB | 3.00 |
| 75-79 | CB | 2.50 |
| 74 and below | FF | |
| | FA | Fail from attendance |

**Other Grades:**

**I: Incomplete** is given to a student who provides supporting evidence through genuine and valid documentation of illness or other reason which has prevented her/him form completing the necessary course work. In such a case, within 15 days form the day of submitting the grades to the Registrar's Office, the student required complete the missing work and obtain a grade. Otherwise, the I grade will automatically become an F

**P: Pass** is given to students who are successful in taking non-credit courses.

**X: In Progress** is used when the work of a student is a course extends past the time for reporting grades.

**T: Transfer** is given to courses accepted as equivalents in transfers form other universities.

**W: Withdrawal** is given if a student withdraws from a course after the add/drop period within the first 10 weeks after the semester starts, with the recommendation of her/his advisor and the permission of the instructor concerned.

### Overall Classification of the Qualification

| | | |
|---|---|---|
| Honors | 3.00-3.49 | 1 |
| High Honors | 3.50-4.00 | 1 |

**CONTACTS**

Head of the Department

Assoc. Prof. Dr. Vildan ÜSTOĞLU ÜNAL
Vice Dean of Faculty of Arts and Sciences
Physics Department
Ext:1670
vunal@yeditepe.edu.tr

Bologna Coordinator
Assist. Prof. Dr Melda PATAN ALPER
Physics Department
Ext:1688
mpatan@yeditepe.edu.tr

Address:
Yeditepe Üniversitesi, 26 Ağustos Yerleşimi, Fen-Edebiyat Fakültesi, Fizik Bölümü,
İnönü Mah., Kayışdağı, 34755, ATAŞEHİR,
İSTANBUL, TÜRKİYE

Secretary:
Burcu EBELER
Tel : +90 216 578 0671, Fax: +90 216 578 0672