Course Description Form	
Course Code and Name	Advanced Electronics
Course Semester	2
Catalog Content	Band Diagrams and Band structures, semiconductor, PN junctions, Schottky junctions, The circuit mechanism in the PN junctions, Diodes, The types of Diodes, BJT, FET, MOSFET, Op-amps, feedback Amplifiers; Negative–Feedback Amplifiers.
Textbook	Robert L. Boylestad & Louis Nashelsky (2011). *Elektronik Cihazlar ve Devre Teorisi,* Palme Yayıncılık Selek, Hasan Selçuk (2019). *Elektronik 1*, İstanbul: Seçkin Yayıncılık Demirel, H. (2018). *Elektronik-I*, İstanbul:Birsen Yayınevi. Ercan, Ö. (2005). *Analog Elektronik (Diyod,Bjt,Fet,Mosfet)*, Altaş Yayıncılık.
Supplementary Textbooks	M. Sait Türköz (2011). *Elektronik*, Birsen Yayınevi Robert L. Boylestad & Louis Nashelsky (2011). *Electronic Devices and Circuit Theory*, Pearson Education Charles K. Alexander & Matthew N. O. Sadiku (2012*). Fundamentals of Electric Circuits*, McGraw-Hill.
Credit	6
Prerequisites of the Course (Attendance Requirements)	None
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	This course aims to develop an understanding of the concept of analog electronic, to introduce the students about the band structures, semiconductor, transistor and diode; to understand op. amp. working and its analysis; to know about the amplifier using BJT and FET; to understand the working of transistor, FET and MOSFET
Course Learning Outcomes	1. Understand the basic properties of semiconductors and band structures 2. Understand the diodes types and its characteristicsand analyze diodes circuits. 3. Understand the basic characteristics of BJT and gain an ability to DC analyze of BJT circuits. 4. Ability to analyze of BJT amplifiers 5. Understand the basic characteristics of FET (JFET, MOSFET) and to analyze of FET circuits. 6. Understand the characteristics of BJT, JFET and MOSFET 7. Distinguish between JFET and BJT. 8. Understand the some op. amp. working and its analysis
Instruction Methods	This course is taught face to face or online.
Weekly Schedule	Week 1: Semiconductor Week 2: Band Diagrams and Band structures, p and n type semiconductor Week 3: The structure of Diodes and circuit mechanisms Week 4: The types of Diodes and properties, Week 5: Analysis of diode circuits, sample circuit analysis Week 6: Classification and structure of transistors, connection types of transistors, Week 7: BJT Load-Line Analysis, BJT DC Analysis Week 8: The characteristics of the BJT, question solutions Week 9: Classification, types and structure of FET, comparison of FET and BJT, Week 10: Construction and characteristics of JFETs, question solutions Week 11: Classification, types and structure of MOSFET,

	Week 12: Construction and characteristics of MOSFETs, question solutions Week 13: Transistor amplifies, Op-amps Week 14: Analysis of some Op-amps
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Reading Activities: 39 Internet browsing, library work:21 Preparation of Midterm and Midterm Exam: 24 Final Exam and Preparation for Final Exam: 24

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	-	-
Assignment	1	40
Application	-	-
Projects	-	-
Practice	-	-
Quiz	-	-
Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	-	-	
Reading Tasks	13	3	39
Studies	3	7	21
Material Design and Implementation	-	-	
Report Preparing	-	-	
Preparing a Presentation	-	-	
Presentations	-	-	
Midterm Exam and Preparation for Midterm Exam	12	2	24
Final Exam and Preparation for Final Exam	12	2	24
Other (should be emphasized)	-	-	
Total Workload			150
Total Workload / 25			6.00
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research					x
2	Grasping the inter-					

		disciplinary interaction related to physics education					x	
	3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education				x		
	4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines				x		
	5	Solves the issues of physics education by using scientific methods			x			
	6	The ability to carry out a specialist study related to physics education independently				x		
	7	Developing new strategic approaches to solve the unforeseen and complex problems arising in the practical processes					x	
	8	Coming up with solutions while taking responsibility						

	9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education			x			
	10	Evaluates issues with a critical eye and encourages learning				x		
	11	Transferring the current developments in the physics education and his/her own work within the national and international environments orally, visually and in written forms				x		
	12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary			x			
	13	Having proficiency in a foreign language and establishing written and oral communication with that language	x					
	14	Uses computer programs competent enough for	x					

	physics education						
15	Using communication technologies efficiently and according to the needs of the physics education		x				
16	Collects data related to the physics education, reviews and makes conclusions; implements and shares them by considering ethical values				x		
17	Develops different perspectives related to the physics education, plans them and assesses them within the quality framework				x		
18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies				x		

The Course's Lecturer(s) and Contact Information	1. Name, Surname : Prof. Dr. Şebnem KANDİL İNGEÇ 2. E-mail address: singec@gazi.edu.tr

Course Description Form	
Course Code and Name	Advanced Quantum Physics
Course Semester	1
Catalog Content	Quantum physics concepts, the relationship between quantum physics and classical physics, quantum philosophy, technological applications of quantum physics.
Textbook	Lecturer's notes
Supplementary Textbooks	Serway, R.A. Physics for Scientists & Engineers with Modern Physics. Taylor, J.R. & Zafaritos, C.D. Modern Physics for Scientists and Engineers.
Credit	6
Prerequisites of the Course *(Attendance Requirements)*	None
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	To learn the concepts and laws of Quantum Physics, to comprehend the philosophical aspects of the events that take place in the subatomic world.
Course Learning Outcomes	1. Explains the concepts and laws of quantum physics. 2. Establishes the relationship between quantum physics subjects and other physics subjects. 3. Develops perspective on quantum philosophy. 4. Explains the differences and relationship between subatomic world and macro world. 5. Researches the technological applications of quantum physics.
Instruction Methods	Face to face
Weekly Schedule	Week 1: Black body radiation, Week 2: Photoelectric effect, Week 3: Compton Olayı, Week 4: Atomic structure and spectra, Week 5: Atom Models, Bohr's Atom Model, Week 6: Wave Properties of Particles, Week 7: Introduction to quantum mechanics, double slit experiment with electrons Week 8: Heisenberg's uncertainty principle , Week 9: Quantum wave function, phase and group velocities, Week 10: Operator concept, expected value calculation, Week11: Eigenvalue equation, Week 12: Schrödinger equation solutions for infinite well potential and finite well potential, Week 13: Schrödinger equation solutions for infinite well potential and finite well potential, Week 14: Three-dimensional Schrödinger equation, solutions for the hydrogen atom.
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Weekly applied course hours Reading Activities: 30 Internet browsing, library work:30 Designing and implementing materials Report preparing: 14 Preparing a Presentation: 12 Presentations: 3 Preparation of Midterm and Midterm Exam: 10 Final Exam and Preparation for Final Exam: 10
Assessment Criteria	

	Numbers	**Total Weighting (%)**

Midterm Exams	1	40
Assignment		
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)	1	60
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			0
Reading Tasks	10	3	30
Studies	10	3	30
Material Design and Implementation			0
Report Preparing	7	2	14
Preparing a Presentation	2	6	12
Presentations	1	3	3
Midterm Exam and Preparation for Midterm Exam	2	5	10
Final Exam and Preparation for Final Exam	2	5	10
Other (should be emphasized)			
Total Workload			151
Total Workload / 25			6,04
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research			X		
2	Grasping the inter-disciplinary interaction related to physics education.		X			
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education			X		
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines			X		
5	Solves the issues of physics education by using scientific methods		X			
6	The ability to carry out a specialist study related to physics education independently		X			
7	Developing new strategic approaches to solve the unforeseen and complex problems arising in the practical processes			X		
8	Coming up with solutions while taking responsibility				X	
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education				X	
10	Evaluates issues with a critical eye and encourages learning					X
11	Transferring the current developments in the physics education and his/her own work within the national and			X		

		international environments orally, visually and in written forms					
	12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary					X
	13	Having proficiency in a foreign language and establishing written and oral communication with that language	X				
	14	Uses computer programs competent enough for physics education				X	
	15	Using communication technologies efficiently and according to the needs of the physics education		X			
	16	Collects data related to the physics education, reviews and makes conclusions; implements and shares them by considering ethical values					X
	17	Develops different perspectives related to the physics education, plans them and assesses them within the quality framework				X	
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies			X		
The Course's Lecturer(s) and Contact Information	Name, Surname: Prof. Dr. Pervin ÜNLÜ YAVAŞ E-mail: pervinunlu@gazi.edu.tr						

Course Description Form	
Course Code and Name	Developing Tests in Physics Education
Course Semester	1
Catalog Content	Measurement, scale types, scale development stages, scale adaptation stages, validity and reliability studies.
Textbook	• DeVellis, R. F. (2017). Ölçek geliştirme kuram ve uygulamalar. (3. Baskıdan Çeviri), Ankara: Nobel Yayınevi. • Özdamar, K. (2017). Ölçek ve Test Geliştirme Yapısal Eşitlik Modellemesi. (2. Baskı) Eskişehir: Nisan Kitabevi. • Seçer, İ. (2018). Psikolojik test geliştirme ve uyarlama süreci. (2. Baskı). Ankara: Anı Yayıncılık.
Supplementary Textbooks	• Ural, A., Kılıç, İ., (2005), Bilimsel Araştırma Süreci ve SPSS ile Veri Analizi, SPSS 12.0 For Windows, Ankara: Detay Yayıncılık. • Şencan, H., (2005), Sosyal ve Davranışsal Ölçümlerde Güvenirlik ve Geçerlilik, Ankara: Seçkin Yayıncılık.
Credit	6
Prerequisites of the Course (Attendance Requirements)	None
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	To evaluate appropriate measurement tools, adapt and improve measurement tools.
Course Learning Outcomes	1. Understands the importance of measurement in teaching. 2. Analyze the characteristics of the scales. 3. Knows the basic concepts of test development. 4. Understands the process of test development. 5. Criticize an improved test.
Instruction Methods	This course only is given face to face.
Weekly Schedule	Week 1: Introduction to measurement: The place of measurement in education, scale properties of measurement results Week 2: Some statistical concepts Week 3: Scale development principles Week 4: Scale and test types Week 5: Likert scales Week 6: Concept and achievement tests Week 7: Concept and achievement tests Week 8: Validity and Reliability Week 9: Validity and Reliability Week 10: Validity analysis Week 11: Item analysis Week 12: Scale adaptation principles Week 13: Examples and applications Week 14: Examples and applications
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Weekly applied course hours: 0 Reading Activities Internet browsing, library work: 28 Designing and implementing materials Report preparing: 9 Preparing a Presentation Presentations: 9 Preparation of Midterm and Midterm Exam: 35 Final Exam and Preparation for Final Exam: 35

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	40
Assignment		
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks			
Studies	7	4	28
Material Design and Implementation			
Report Preparing	3	3	9
Preparing a Presentation			
Presentations	3	3	9
Midterm Exam and Preparation for Midterm Exam	7	5	35
Final Exam and Preparation for Final Exam	7	5	35
Other (should be emphasized)			
Total Workload			158
Total Workload / 25			6.32
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research			x		
2	Grasping the inter-disciplinary interaction related to his field	x				
3	The ability to use the expert-level theoretical and practical knowledge		x			

	acquired in his field					
4	Interpreting and forming new types of knowledge by combining the knowledge from the area and the knowledge from various other disciplines	x				
5	Solves the issues of his field by using scientific methods			x		
6	The ability to carry out a specialist study related to his area independently		x			
7	Developing new strategic approaches to solve the unforeseen and complex problems arising in the practical processes		x			
8	Coming up with solutions while taking responsibility				x	
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to his field					x
10	Evaluates issues with a critical eye and encourages learning				x	

	11	Transferring the current developments in the area and his/her own work within the national and international environments orally, visually and in written forms		x			
	12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary	x				
	13	Having proficiency in a foreign language and establishing written and oral communication with that language	x				
	14	Uses computer programs competent enough for his department				x	
	15	Using communication technologies efficiently and according to the needs of the department	x				
	16	Collects data related to the field, reviews and makes conclusions; implements and shares them by	x				

		considering ethical values					
	17	Develops different perspectives related to the field, plans them and assesses them within the quality framework	x				
	18	Internalizes the knowledge gained in the field, transforms it into a skill and uses it with interdisciplinary studies	x				
The Course's Lecturer(s) and Contact Information	1. Name, Surname: 2. E-mail address: 3.						

Course Description Form	
Course Code and Name	Educational Statistic and Applications
Course Semester	2
Catalog Content	The course is an introduction to quantitative methods for research in social and behavioral sciences. Students will examine the basic concepts and procedures of descriptive and inferential statistics. Students will develop competence in reading and understanding statistical topics from sources such as theses, articles or reports. The course also includes an introduction to the use and interpretation of SPSS.
Textbook	1. Hinkle, D.E., Wiersma, W. & Jurs, S.G. (1994). A*pplied Statistics for the Behavioral Sciences*, 3rd edition, Houghton Mufflin Comp, USA 2. Gravetter, F.J. and Wallnau, L.B. (2017). *Statistics for the Behavioral Sciences*. 10th edition. Wadsworth/Thomson Learning, USA. 3. Sosyal Bilimler için Veri Analizi El Kitabı İstatistik, Araştırma Deseni SPSS Uygulamaları ve Yorum- Şener Büyüköztürk Yayınevi: Pegem Akademi Yayıncılık 4. İstatistiğe Giriş-Nilgün Köklü-Şener Büyüköztürk-Pegem Yayıncılık
Supplementary Textbooks	1. SPSS uygulamalı Çok Değişkenli İstatistik Teknikleri-Şeref Kalaycı-Asil Yayın Dağıtım 2. SPSS kullanma kılavuzu Julie Pallant Çeviri: Sibel Balcı-Berat Ahi Anı yayıncılık
Credit	6
Prerequisites of the Course (Attendance Requirements)	To have taken a course on research methods.
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	1. Understand the role of descriptive and inferential statistics as part of quantitative research methodology. 2. Demonstrate the usefulness of descriptive and inferential statistics as part of quantitative research methodology. 3. Explain quantitative results using descriptive statistics. 4. Use inferential statistics to test hypotheses. 5. Designing research hypotheses. 6. Develop competence in the use of SPSS for the classification and identification of data. 7. Obtaining information about statistical procedures from library and internet resources. 8. Compare statistical processes for different purposes. 9. Plan and perform basic statistical analysis of research data. 10. Select appropriate statistical methods according to the circumstances.
Course Learning Outcomes	Students, 1. understand the basic concepts of statistics (eg statistics, parameters, descriptive statistics, inferential statistics and sampling error) 2. develop skills in understanding and applying descriptive statistical techniques (Creates frequency distribution tables and appropriate graphs for given data, calculates mean, median and mode center trend measures, Defines variability calculation measures, defines a data set (a set of points) using appropriate descriptive statistics) . 3. develop the skills of understanding and applying procedural / inferential statistical techniques (applies the inferential

<table>
<tr><td></td><td>statistics technique appropriate to the situations discussed. Interprets the results of an inference test and summarizes the results of inferential statistical techniques using the APA style.)
4. understand statistical assumptions (distinguishes between parametric and non-parametric statistical tests, explains the basic assumptions of a given statistical test, determines when each of these assumptions has been violated)
5. understand standardized distributions. (z-scores calculates a z score for a given raw score, comments)
6. understand the concept of distribution and the concept of z for sample mean
7. develop the ability to use computers for statistical analysis of data. Describes general statistical terms correctly in a statistical context. Calculates descriptive and inferential statistics using a computer program (eg SPSS), interprets the SPSS output for a given descriptor and / or inferential statistics.</td></tr>
<tr><td>Instruction Methods</td><td>This course will face-to-face training</td></tr>
<tr><td>Weekly Schedule</td><td>Week-1: Introduction to Statistics (Population, Sample, Scientific Method, Measurement, Discontinuous and Continuous Variables, Statistical terms)
Week 2: Frequency Distributions, Central Tendency, Variability, z-scores
Week 3: Probability and Sample, Introduction to Hypothesis Testing
Week 4: Introduction to t-Statistics, Two Independent Sample Hypothesis Tests
Week 5: Related Sample Hypothesis Tests, Estimation
Week 6: Introduction to Analysis of Variance
Week 7: Repeated Measures Analysis of Variance
Week 8: Two-way analysis of variance
Week 9: Correlation and Regression
Week 10: Multiple Linear Regression
Week 11: Covariance Analysis
Week 12: Chi-Square Statistics: Goodness of Fit and Independence Test
Week 13: Nonparametric Tests
Week 14: Review of Statistical Techniques</td></tr>
<tr><td>Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)</td><td>Weekly theoretical course hours: 3
Weekly applied course hours:
Reading Activities: 42
Internet browsing, library work: 42
Designing and implementing materials:
Report preparing: 28
Preparing a Presentation:
Presentations:
Preparation of Midterm and Midterm Exam: 28
Final Exam and Preparation for Final Exam: 28</td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th></th><th>Numbers</th><th>Total Weighting (%)</th></tr>
<tr><td>Midterm Exams</td><td>1</td><td>20</td></tr>
<tr><td>Assignment</td><td>1</td><td>20</td></tr>
<tr><td>Application</td><td></td><td></td></tr>
<tr><td>Projects</td><td></td><td></td></tr>
<tr><td>Practice</td><td></td><td></td></tr>
<tr><td>Quiz</td><td></td><td></td></tr>
<tr><td>Percent of In-term Studies (%)</td><td></td><td>40</td></tr>
<tr><td>Percentage of Final Exam to Total Score (%)</td><td></td><td>60</td></tr>
</table>
</td></tr>
</table>

	Attendance						
Workload	**Activity**		**Total Number of Weeks**		**Duration (weekly hour)**		**Total Period Work Load**
	Weekly Theoretical Course Hours		14		3		42
	Weekly Tutorial Hours						
	Reading Tasks		14		3		42
	Studies		14		3		42
	Material Design and Implementation						
	Report Preparing		14		2		28
	Preparing a Presentation						
	Presentations						
	Midterm Exam and Preparation for Midterm Exam		14		2		28
	Final Exam and Preparation for Final Exam		14		2		28
	Other (should be emphasized)						
	Total Workload						210
	Total Workload / 25						8,4
	Course Credit (ECTS)						8
Contribution Level Between Course Learning Outcomes and Program Outcomes	No	Program Outcomes	1	2	3	4	5
	1	Course develops student's skills of expression and research related to physics education.					X
	2	Grasping the inter-disciplinary interaction related to physics education.					X
	3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.					X
	4	Interpreting and forming new types of knowledge by combining the knowledge from the					X

		physics education and the knowledge from various other disciplines.					
	5	Solves the issues of physics education by using scientific methods.					X
	6	The ability to carry out a specialist study related to physics education independently.					X
	7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.					X
	8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X
	9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.				X	
	10	Evaluates issues related to physics education with				X	

		a critical eye and encourages learning.					
	11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.				X	
	12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary				X	
	13	Having proficiency in a foreign language and			X		
	14	establishing written and oral communication with that language				X	
	15	Uses computer programs competent enough for related to physics education.		X			
	16	Using communication technologies efficiently and according to the needs of the physics education.					X
	17	Collects data related to					X

		physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					
	18	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.					X
The Course's Lecturer(s) and Contact Information	1. Name, Surname: Assoc. Prof. Dr. Uygar KANLI E-mail address: ukanli@gazi.edu.tr						

<table>
<tr><th colspan="2">Course Description Form</th></tr>
<tr><td>Course Code and Name</td><td>Fluid Mechanics</td></tr>
<tr><td>Course Semester</td><td>2</td></tr>
<tr><td>Catalog Content</td><td>Basic concepts, Units and unit systems, Basic properties of fluids, types of fluids Fluid Static: Pressure, change of pressure with depth, practical applications of pressure - depth correlation, Pressure force acting on planar surfaces, pressure force acting on cylindrical surfaces Archimedes law, fluid dynamics, fluid kinematics, Bernoulli and Energy Equations</td></tr>
<tr><td>Textbook</td><td>Fluid mechanics, Yunus A.Çengel, John M. Cimbala, McGraw-Hill</td></tr>
<tr><td>Supplementary Textbooks</td><td>Fox and McDonald’s Introduction to Fluid Mechanics, Philip J. Pritchard, John C. Leylegian, John Wiley & Sons, Inc.</td></tr>
<tr><td>Credit</td><td>6</td></tr>
<tr><td>Prerequisites of the Course (Attendance Requirements)</td><td>There is no prerequisite or co-requisite for this course.</td></tr>
<tr><td>Type of the Course</td><td>Elective</td></tr>
<tr><td>Instruction Language</td><td>Turkish</td></tr>
<tr><td>Course Objectives</td><td>Learning basic knowledge about fluid mechanics</td></tr>
<tr><td>Course Learning Outcomes</td><td>Giving general concepts of fluid, fluid statics and basic concepts of flow. teaching basic information about the equipment used in flow lines</td></tr>
<tr><td>Instruction Methods</td><td>This course only is given face to face.</td></tr>
<tr><td>Weekly Schedule</td><td>Week-1: Fluid concept, classification of fluids, dimensions and units
Week 2: Fluid properties, Density, Vapor pressure and Cavitation
Week 3: Compressibility and speed of sound, Viscosity, Surface tension and capillarity
Week 4: Fluid Statics: Pressure, Hydrostatic forces acting on submerged surfaces
Week 5: Buoyancy, Stability of sinking and floating objects
Week 6: Fluids making solid body motion
Week 7: Fluid Kinematics: Lagrange and Euler approaches
Week 8: Flow patterns, drawing of flow data
Week 9: Vorticity and turnover,
Week 10: Reynolds transport theorem
Week 11: Conservation of mass and energy in flow, linear momentum equation
Week 12: Bernoulli equation
Week 13: Applications of Bernoulli's equation
Week 14: Energy transfer with heat and work</td></tr>
<tr><td>Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)</td><td>Weekly theoretical course hours: 3
Reading Activities: 20
Internet browsing, library work: 25
Designing and implementing materials: 3
Report preparing:
Preparing a Presentation: 9
Presentations: 2
Preparation of Midterm and Midterm Exam: 24
Final Exam and Preparation for Final Exam: 25</td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th></th><th>Numbers</th><th>Total Weighting (%)</th></tr>
<tr><td>Midterm Exams</td><td>1</td><td>40</td></tr>
<tr><td>Assignment</td><td></td><td></td></tr>
<tr><td>Application</td><td></td><td></td></tr>
<tr><td>Projects</td><td></td><td></td></tr>
</table>
</td></tr>
</table>

Practice			
Quiz			
Percent of In-term Studies (%)		40	
Percentage of Final Exam to Total Score (%)		60	
Attendance			

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	4	5	20
Studies	5	5	25
Material Design and Implementation	1	3	3
Report Preparing			0
Preparing a Presentation	3	3	9
Presentations	1	2	2
Midterm Exam and Preperation for Midterm Exam	4	6	24
Final Exam and Preperation for Final Exam	5	5	25
Other (should be emphasized)			
Total Workload			150
Total Workload / 25			6
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.		X			
2	Grasping the inter-disciplinary interaction related to physics education.		X			
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.				x	
4	Interpreting and forming new types of			X		

	knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.						
5	Solves the issues of physics education by using scientific methods.			X			
6	The ability to carry out a specialist study related to physics education independently.			X			
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.				X		
8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.		X				
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.					X	
10	Evaluates issues related to physics education with a critical eye			X			

	and encourages learning.						
11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.	X					
12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary		X				
13	Having proficiency in a foreign language and establishing written and oral communication with that language	X					
14	Uses computer programs competent enough for related to physics education.				X		
15	Using communication technologies efficiently and according to the needs of the physics education.	x					
16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.				x		

	17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.			X			
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.		X				
The Course's Lecturer(s) and Contact Information	1. Name, Surname: Assoc. Prof. Dr. Mustafa Güray BUDAK E-mail address: ukanli@gazi.edu.tr							

Course Description Form	
Course Code and Name	Fundamental Concepts in Physics I
Course Semester	1
Catalog Content	Measurement and Unit Systems/ Force-The Rotate Effect of Force and Torque/Mass and Gravity, Balance and Conditions of Balance, Motion, Velocity and Acceleration, Newton's First Law, Second Law and Third Law, Harmonic Motion, Work and Power, Impulse and Momentum, Conservation of Momentum, Rigid body motions, kinetic energy of rotation body, angular momentum and conservation of angular momentum.
Textbook	1.Atasoy, B., 2002, 'Fen öğrenimi ve öğretimi', Gündüz Eğitim ve Yayıncılık, Ankara. 2.Chiappetta, E. L. and Koballa, T.R. 'Science Instruction in the Middle and Secondary Schools', 2.Merril Prentice Hall Fizik I (Serway – Beıchner) 4.Fizik İlkeleri-I (Bueche-Jerde) Turgut, M. F., Baker, D., Cunningham, R., Piburn, M., 1997, 'Ortaöğretim Fizik Öğretimi', YÖK / Dünya Bankası, Milli Eğitimi Geliştirme Projesi, Hizmet Öncesi Öğretmen Eğitimi Yayını, Ankara.Different physics textbooks
Supplementary Textbooks	-
Credit	6
Prerequisites of the Course	None
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	To ensure that students reinforce the concepts they see in mechanical subjects with different approaches during their undergraduate education period.
Course Learning Outcomes	1. Students will review the concepts of basic mechanics concepts. 2. Students will overcome the shortcomings of the concept with basic mechanics concepts. 3. Students establishes a relationship between basic mechanics concepts. 4. Students will discuss the situation with the basic mechanics concepts and solve problems. 5. At the end this course students will be aware of misconceptions and learning difficulties in mechanics.
Mode of Delivery	The mode of delivery of this course is face to face.
Weekly Schedule	Week 1: To discussion of fundamental concepts about Measurement and Unit Systems/ Force-The Rotate Effect of Force and Torque/Mass and Gravity and problem solving. Week 2: To discussion of fundamental concepts about Balance and Conditions of Balance and problem solving. Week 3: To discussion of fundamental concepts about Motion, Velocity and Acceleration and problem solving. Week 4: To discussion of fundamental concepts about Newton's First Law, Second Law and Third Law and problem solving. Week 5: To discussion of fundamental concepts about Basic Harmonic Motion and problem solving. Week 6: To discussion of fundamental concepts about Work and Power and problem solving. Week 7: To discussion of fundamental concepts about Impulse and Momentum, Conservation of Momentum and problem solving. Week 8: To discussion of fundamental concepts about Impulse and Momentum, Conservation of Momentum and problem solving Week 9: To discussion of fundamental concepts about Kinetic and Potential Emery and problem solving. Week 10: To discussion of fundamental concepts about rigid body motions and problem solving. Week 11: To discussion of fundamental concepts about kinetic energy of rotation body and problem solving. Week 12: To discussion of fundamental concepts about angular momentum and conservation of angular momentum and problem solving. Week 13: To discussion of fundamental concepts about angular momentum and conservation of angular momentum and problem solving. Week 14: A general evaluation is made on the topics explained.

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 3
Reading Activities:24
Internet browsing, library work:36
Preparing a Presentation:12
Presentations:12
Preparation of Midterm and Midterm Exam:10
Final Exam and Preparation for Final Exam:12
Other (should be emphasized):2

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	40
Assignment	-	-
Application	-	-
Projects	-	-
Practice	-	-
Quiz	-	-
Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	-	-	-
Reading Tasks	12	2	24
Studies	12	3	36
Material Design and Implementation			-
Report Preparing			
Preparing a Presentation	6	2	12
Presentations	6	2	12
Midterm Exam and Preparation for Midterm Exam	5	2	10
Final Exam and Preparation for Final Exam	6	2	12
Other (should be emphasized)	2	1	2
Total Workload			150
Total Workload / 25			6.00
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics education.				X	
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.					X
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.				X	
5	Solves the issues of physics education by using scientific methods.				X	
6	The ability to carry out a specialist study related to physics education independently.					X
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.					X
8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.				X	

	10	Evaluates issues related to physics education with a critical eye and encourages learning.					X
	11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.			X		
	12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary		X			
	13	Having proficiency in a foreign language and establishing written and oral communication with that language	X				
	14	Uses computer programs competent enough for related to physics education.	X				
	15	Using communication technologies efficiently and according to the needs of the physics education.			X		
	16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.			X		
	17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.					X
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.					X
The Course's Lecturer(s) and Contact Information	Name, Surname: e-mail:						

Course Description Form	
Course Code and Name	Fundamental Concepts in Physics II
Course Semester	2
Catalog Content	Electric Charge / Coulomb Law, Electric Field and Field Lines, Conductive and Insulating Bodies, Electric Field of a Charged Conductor Sphere / Electrical Potential and Potential Difference, Capacitance and Capacitors / Dielectric Capacitors, The Work of Electric Current, Joule Law / Emission Sources / Ohm's Law , Kirchoff's Laws, Magnets / Magnetic Field, Force Acting in the Magnetic Field / Magnetic Field by the Wires Passing Through Current, Moment, Emission in the Wire Moving in the Magnetic Field / Magnetic Field Change in the Ring and Induction.
Textbook	1.Merril Prentice Hall Fizik II (Serway – Beıchner)
Supplementary Textbooks	-
Credit	6
Prerequisites of the Course	None
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	To ensure that students reinforce the concepts they see in electric subjects with different approaches during their undergraduate education period.
Course Learning Outcomes	1.Students will review the concepts of electrics and magnetism concepts. 2.Students will overcome the shortcomings of the concept with electrics and magnetism concepts. 3.Students establishes a relationship between electrics and magnetism concepts. 4.Students will discuss the situation with the electrics and magnetism concepts and solve problems. 5.At the end this course students will be aware of misconceptions and learning difficulties in electrics and magnetism.
Mode of Delivery	The mode of delivery of this course is face to face.
Weekly Schedule	Week 1: To discussion of fundamental concepts about Electric Charges, Kinds of Electrified Coulomb's Law and problem solving. Week 2: To discussion of fundamental concepts about Electric Field, electric field lines, Electroscope, Insulators and Conductors and problem solving. Week 3: To discussion of fundamental concepts The Electric Field of a Sphere of Charge and Electric Potential and problem solving. Week 4: To discussion of fundamental concepts about Capacitance and Capacitors, Combination of Capacitors and Energy Stored in a Capacitor and problem solving. Week 5: To discussion of fundamental concepts about Direct current sources Cells and Batteries, Made up of Electric Current, Resistors and Ohm's Law and problem solving. Week 6: To discussion of fundamental concepts about Work of Electric Current, Joule Law, Combination of Generators, Kirchoff's Laws and problem solving. Week 7: To discussion of fundamental concepts about Magnetic Field and Field Lines and problem solving. Week 8: To discussion of fundamental concepts about Torques on Current Loops, Magnetic Force on a Moving Charge in magnetic field and problem solving. Week 9: To discussion of fundamental concepts about Induced Current in a Circuit, Electromagnetic Induction in a circular Loop and problem solving. Week 9: To discussion of the basic concepts about the force affecting the charged particle moving in a magnetic field that affects a current wire frame. Week 11: To discussion of fundamental concepts about Induction EMK, Models of Generator, Direction of Induction Current and problem solving. Week 12: Induction Emf (Generator Models) / Direction of Induction Current / Discussing the basic concepts about Self Induction and problem solving. Week 13: To discussion of fundamental concepts about Electromagnetic waves and problem solving. Week 14: A general evaluation is made on the topics explained.

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 3
Reading Activities:24
Internet browsing, library work:36
Preparing a Presentation:12
Presentations:12
Preparation of Midterm and Midterm Exam:10
Final Exam and Preparation for Final Exam:12
Other (should be emphasized):2

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	40
Assignment	-	-
Application	-	-
Projects	-	-
Practice	-	-
Quiz	-	-
Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	-	-	-
Reading Tasks	12	2	24
Studies	12	3	36
Material Design and Implementation			-
Report Preparing			
Preparing a Presentation	6	2	12
Presentations	6	2	12
Midterm Exam and Preparation for Midterm Exam	5	2	10
Final Exam and Preparation for Final Exam	6	2	12
Other (should be emphasized)	2	1	2
Total Workload			150
Total Workload / 25			6.00
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics education.				X	
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.					X
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.				X	
5	Solves the issues of physics education by using scientific methods.				X	
6	The ability to carry out a specialist study related to physics education independently.					X
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.					X
8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.				X	

	10	Evaluates issues related to physics education with a critical eye and encourages learning.					X
	11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.			X		
	12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary		X			
	13	Having proficiency in a foreign language and establishing written and oral communication with that language	X				
	14	Uses computer programs competent enough for related to physics education.	X				
	15	Using communication technologies efficiently and according to the needs of the physics education.			X		
	16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.			X		
	17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.					X
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.					X
The Course's Lecturer(s) and Contact Information	Name, Surname: e-mail:						

Course Description Form	
Course Code and Name	Literature in Physics Education I
Course Semester	1
Catalog Content	Analysis of studies, articles and dissertations in National Physics Education: To examine the current trends and patterns of research studies in physics education is very useful to the researchers and graduate students in the field. Moreover, investigation research trends are helpful for their academic career and their future professions.
Textbook	National articles, thesis, etc.
Supplementary Textbooks	
Credit	6
Prerequisites of the Course (Attendance Requirements)	None
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	The purpose of this course is to analyze and discuss published studies and dissertations in the field of physics education. This course will give to students a point of view about trends in physics education.
Course Learning Outcomes	Students can i) show what is going on the research field in physics education, ii) determine which topics are popular in physics education, iii) indicate the gaps and missing parts in the physics literature, and iv) predict research trend in the field.
Instruction Methods	
Weekly Schedule	Week-1: Using databases (ERIC, ProQuest Digital Dissertations, EBSCO, Web of Science, ULAKBIM, SOBİAD etc.) Week-2: Using databases (ERIC, ProQuest Digital Dissertations, EBSCO, Web of Science, ULAKBIM, SOBİAD etc.) Week-3: National Studies about general physics education Week-4: Research methods used in physics education studies Week-5: Measurement tools used in physics education research Week-6: Statistical methods in physics education research Week-7: Projects-Assignments-Presentations Week-8: Learning Methods in Physics Teaching Week-9: Activities and Laboratory in Science / Physics Education Week-10: Teacher Training in physics education studies Week-11: Nature of Science/Physics/Physics Education Week-12: Misconceptions and Conceptual Change in Physics Education Week-13: Argumentation in Physics Education Week-14: Final exam
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Weekly applied course hours :0 Reading Activities: 42 Internet browsing, library work 42 Designing and implementing materials Report preparing: 6 Preparing a Presentation: 6 Presentations: 3 Preparation of Midterm and Midterm Exam: 6 Final Exam and Preparation for Final Exam: 6

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	20
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)	2	40
Percentage of Final Exam to Total Score (%)	1	60
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	14	3	42
Studies	14	3	42
Material Design and Implementation			
Report Preparing	6	1	6
Preparing a Presentation	6	1	6
Presentations	1	3	3
Midterm Exam and Preparation for Midterm Exam	6	1	6
Final Exam and Preparation for Final Exam	6	1	6
Other (should be emphasized)			
Total Workload			153
Total Workload / 25			6.12
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics education.					X
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.					
4	Interpreting and forming new types of knowledge by					X

			combining the knowledge from the physics education and the knowledge from various other disciplines.						
		5	Solves the issues of physics education by using scientific methods.					X	
		6	The ability to carry out a specialist study related to physics education independently.					X	
		7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.				X		
		8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X	
		9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.					X	
		10 11	Evaluates issues related to physics education with a critical eye and encourages learning. Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.					X	
		12	Ability to see and develop social				X		

			relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary						
		13	Having proficiency in a foreign language and establishing written and oral communication with that language			X			
		14	Uses computer programs competent enough for related to physics education.	X					
		15	Using communication technologies efficiently and according to the needs of the physics education.			X			
		16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					X	
		17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.				X		
		18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.					X	
The Course's Lecturer(s) and Contact Information	1. Name, Surname: Assoc. Prof. Dr. Uygar KANLI E-mail address: ukanli@gazi.edu.tr								

Course Description Form				
Course Code and Name	Literature in Physics Education-1			
Course Semester	1			
Catalog Content	Analysis of studies, articles and dissertations in Physics Education: In the parallel of the Physics Education Literature-1 Course in the first semester, continuing to examine the current trends and patterns of research studies in physics education is very useful to the researchers and graduate students in the field. Moreover, investigation research trends are helpful for their academic career and their future professions.			
Textbook	Handbooks, articles, thesis, etc.			
Supplementary Textbooks				
Credit	6			
Prerequisites of the Course (Attendance Requirements)	No			
Type of the Course	Elective			
Instruction Language	Turkish			
Course Objectives	The purpose of this course is to analyze and discuss published studies and dissertations in the field of physics education. This course will give to students a point of view about trends in physics education.			
Course Learning Outcomes	Students can i) show what is going on the research field in physics education, ii) determine which topics are popular in physics education, iii) indicate the gaps and missing parts in the physics literature, and iv) predict research trend in the field.			
Instruction Methods	Face to face			
Weekly Schedule	Week 1: International Studies about general physics education Week 2: International Studies about general physics education Week 3: Learning Methods in Physics Teaching Week 4: Learning Methods in Physics Teaching Week 5: Nature of Science/Physics/Physics Education Week 6: Nature of Science/Physics/Physics Education Week 7: Projects-Assignments-Presentations Week 8: Activities and Laboratory in Science / Physics Education Week 9: Activities and Laboratory in Science / Physics Education Week 10: Teacher Training in physics education studies Week 11: Misconceptions and Conceptual Change in Physics Education Week 12: Misconceptions and Conceptual Change in Physics Education Week 13: Argumentation in Physics Education Week 14: General Discussing			
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Weekly applied course hours :0 Reading Activities: 42 Internet browsing, library work 42 Designing and implementing materials Report preparing: 6 Preparing a Presentation: 6 Presentations: 3 Preparation of Midterm and Midterm Exam: 6 Final Exam and Preparation for Final Exam: 6			
Assessment Criteria		**Numbers**	**Total Weighting**	

			(%)
Midterm Exams	1	20
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)	2	40
Percentage of Final Exam to Total Score (%)	1	60
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	14	3	42
Studies	14	3	42
Material Design and Implementation			
Report Preparing	6	1	6
Preparing a Presentation	6	1	6
Presentations	1	3	3
Midterm Exam and Preparation for Midterm Exam	6	1	6
Final Exam and Preparation for Final Exam	6	1	6
Other (should be emphasized)			
Total Workload			153
Total Workload / 25			6,12
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics education.					X
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.					
4	Interpreting and forming new types of knowledge by combining the					X

			knowledge from the physics education and the knowledge from various other disciplines.						
		5	Solves the issues of physics education by using scientific methods.					X	
		6	The ability to carry out a specialist study related to physics education independently.					X	
		7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.				X		
		8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X	
		9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.					X	
		10 11	Evaluates issues related to physics education with a critical eye and encourages learning. Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.					X	
		12	Ability to see and develop social relationships and				X		

			the norms directing these relationships with a critical look and the ability to take action to change these when necessary						
		13	Having proficiency in a foreign language and establishing written and oral communication with that language			X			
		14	Uses computer programs competent enough for related to physics education.	X					
		15	Using communication technologies efficiently and according to the needs of the physics education.			X			
		16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					X	
		17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.				X		
		18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.					X	
The Course's Lecturer(s) and Contact Information	1. Name, Surname: Assoc. Prof. Dr. Uygar KANLI E-mail address: ukanli@gazi.edu.tr								

<table>
<tr><th colspan="2">Course Description Form</th></tr>
<tr><td>Course Code and Name</td><td>Masters' Seminar</td></tr>
<tr><td>Course Semester</td><td>2</td></tr>
<tr><td>Catalog Content</td><td>In this course, students are aimed to research the studies in the field of Physics Education, to review the literature and to prepare for the thesis they will prepare.</td></tr>
<tr><td>Textbook</td><td>1.Büyüköztürk, Ş. (2009). Sosyal Bilimler İçin Veri Analiz El Kitabı (10. Baskı) --</td></tr>
<tr><td>Supplementary Textbooks</td><td>-</td></tr>
<tr><td>Credit</td><td>5</td></tr>
<tr><td>Prerequisites of the Course</td><td>None</td></tr>
<tr><td>Type of the Course</td><td>Compulsory</td></tr>
<tr><td>Instruction Language</td><td>Turkish</td></tr>
<tr><td>Course Objectives</td><td>In this course, it is aimed that the students thoroughly research the studies in the field of Physics Education and prepare for the thesis they will prepare.</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Researches some topics that will guide the thesis study.
2. Makes a detailed literature research on the chosen topic.
3. Collects data with scientific method, reports and presents according to the thesis writing rules.
4. Gains experience in preparing a thesis on physics education and evaluating the results.</td></tr>
<tr><td>Mode of Delivery</td><td>The mode of delivery of this course is face to face.</td></tr>
<tr><td>Weekly Schedule</td><td>Week 1: To inform the students about the course and the topics to be researched.
Week 2: Determining the topics that students choose / can choose as the subject of the seminar.
Week 3: Determining the topics that students choose / can choose as the subject of the seminar.
Week 4: Examining the researches and the preparations they have made on the topics chosen by the students.
Week 5: Examining the researches and the preparations they made about the topics chosen by the students.
Week 6: Making presentations about the topics chosen by the students.
Week 7: Making presentations about the topics chosen by the students.
Week 8: Making presentations about the topics chosen by the students.
Week 9: Making presentations about the topics chosen by the students.
Week 10: Making presentations about the topics chosen by the students.
Week 11: Making presentations about the topics chosen by the students.
Week 12: Making presentations about the topics chosen by the students.
Week 13: Making presentations about the topics chosen by the students.
Week 14: A general evaluation is made on the topics discussed.</td></tr>
<tr><td>Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)</td><td>Weekly practice class hours: 2
Reading Activities:24
Internet browsing, library work:21
Preparing a Presentation:18
Presentations:16
Preparation of Midterm and Midterm Exam:3
Final Exam and Preparation for Final Exam:14
Other (should be emphasized):4</td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th></th><th>Numbers</th><th>Total Weighting (%)</th></tr>
<tr><td>Midterm Exams</td><td>-</td><td>-</td></tr>
<tr><td>Assignment</td><td>1</td><td>40</td></tr>
<tr><td>Application</td><td>-</td><td>-</td></tr>
<tr><td>Projects</td><td>-</td><td>-</td></tr>
<tr><td>Practice</td><td>-</td><td>-</td></tr>
<tr><td>Quiz</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
</table>

Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour	Total Period Work Load
Weekly Theoretical Course Hours	-	-	
Weekly Tutorial Hours	14	2	28
Reading Tasks	12	2	24
Studies	7	3	21
Material Design and Implementation			-
Report Preparing			
Preparing a Presentation	9	2	18
Presentations	8	2	16
Midterm Exam and Preparation for Midterm Exam	3	1	3
Final Exam and Preparation for Final Exam	7	2	14
Other (should be emphasized)	2	2	4
Total Workload			128
Total Workload / 25			5,12
Course Credit (ECTS)			5

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.		X			
2	Grasping the inter-disciplinary interaction related to physics education.				X	
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.				X	
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.					X
5	Solves the issues of physics education by using scientific methods.				X	
6	The ability to carry out a specialist study related to physics education independently.				X	
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.					X
8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.				X	
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.				X	
10	Evaluates issues related to physics education with a critical eye and encourages learning.					X
11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.			X		
12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary		X			
13	Having proficiency in a foreign language and establishing written and oral communication with that language	X				
14	Uses computer programs competent enough for related to physics education.	-				
15	Using communication technologies efficiently and according to the needs of the physics education.			X		
16	Collects data related to physics education, reviews and makes					X

		conclusions; implements and shares them by considering ethical values.						
	17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.				X		
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.				X		
The Course's Lecturer(s) and Contact Information	Name, Surname: e-mail:							

Course Description Form	
Course Code and Name	Methodology of Academical Writing and Publishing in Physics Education
Course Semester	2
Catalog Content	What is the academic publishing (articles, theses, papers)? What to do before coming to the stage of writing a scientific paper? Comprising of a scientific article in which? Integrity of academic publications; Style and language in academic publications. Ethical rules to be followed in academic publications; Stage of the publishing process and correspondence
Textbook	- Robert A. Day (Translation: G. Aşkar Altay), How to write a scientific paper and published? 4th Edition. 2000 December, Tübitak Publishing. - O.C. Çırakoğlu, Z. Yeniçeri, D. Kökdemir, K. Demirutku, B. Muratoğlu, G. Işın, P.Sayın, Rules of Academic Writing, 3rd Edition. 2011 December, Başkent University University Department of Psychology Publications
Supplementary Textbooks	-
Credit	8
Prerequisites of the Course	There is no prerequisite or co-requisite for this course.
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	The main objective of this course is to gain to students; knowledge and skills about the processes to be followed in the process of writing and publishing of academic publications.
Course Learning Outcomes	At the end of the course, it is expected that students who have successfully completed the course will be able to: 1) Knows what needs to be done before the stage of academic writing and understand the importance of this process. 2) Know the steps to be followed in academic writing process, 3) Know the steps to be followed in academic publishing. 4) Know and understand the importance of ethical rules to be followed in academic publications.
Mode of Delivery	The mode of delivery of this course is face to face.
Weekly Schedule	Week 1: What is the academic publishing (articles, theses, papers)? Week 2: What parts does a scientific article consist of? Week 3: What to do before coming to the stage of writing a scientific paper? Week 4: How to prepare the abstract and summary? How to prepare the introduction section of the article? Week 5: References how should be done in academic publication? How to prepare the Methods section? Week 6: Assumptions and limitations refer to what? Results should be presented in which order? How to tables and figures should be prepared in academic papers? Week 7: How to write the conclusion section? Importance of the acknowledgment Week 8: Principles of writing Bibliography; APA criteria Week 9: Integrity of academic publications Week 10: Style and language in academic publications Week 11: Ethical rules to be followed in academic publications Week 12: Publication processes that should be followed during Week 13: Selection of Journal; Index information Week 14: Impact factor; The frequency of publication of the Journal; Stage of the publishing process and correspondence
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Reading Activities:48 Internet browsing, library work:36 Report preparing:36 Preparing a Presentation:10 Presentations:12 Preparation of Midterm and Midterm Exam:4 Final Exam and Preparation for Final Exam:10 Other (should be emphasized):2

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	-	-
Assignment	1	40
Application	-	-
Projects	-	-
Practice	-	-
Quiz	-	-
Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	-	-	-
Reading Tasks	12	4	48
Studies	12	3	36
Material Design and Implementation			-
Report Preparing	12	3	36
Preparing a Presentation	10	1	10
Presentations	12	1	12
Midterm Exam and Preparation for Midterm Exam	4	1	4
Final Exam and Preparation for Final Exam	10	1	10
Other (should be emphasized)	2	1	2
Total Workload			200
Total Workload / 25			8
Course Credit (ECTS)			8

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics education.					X
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.					X
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.					X
5	Solves the issues of physics education by using scientific methods.				X	
6	The ability to carry out a specialist study related to physics education independently.					X
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.					X
8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.				X	
10	Evaluates issues related to physics education with a critical eye and encourages learning.					X
11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.					X
12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the					X

		ability to take action to change these when necessary					
	13	Having proficiency in a foreign language and establishing written and oral communication with that language	X				
	14	Uses computer programs competent enough for related to physics education.					X
	15	Using communication technologies efficiently and according to the needs of the physics education.					X
	16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					X
	17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.					X
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.					X

The Course's Lecturer(s) and Contact Information	Name, Surname: Prof. Dr. Yasin ÜNSAL e-mail: yunsal@gazi.edu.tr

<table>
<tr><th colspan="2">Course Description Form</th></tr>
<tr><td>Course Code and Name</td><td>Misconceptions in Physics Education</td></tr>
<tr><td>Course Semester</td><td>2</td></tr>
<tr><td>Catalog Content</td><td>Misconception, Characteristics of Misconceptions, How to Identify Misconceptions, Tests for Measuring Misconceptions, Commonly Misconceptions in Physics</td></tr>
<tr><td>Textbook</td><td>1. Konu Alanı Ders Kitabı İnceleme Kılavuzu-Fizik (Yağbasan,R., Güneş, B., v.d., Gazi Büro Yayınları, 2005)
2. Lise Fizik Ders kitapları</td></tr>
<tr><td>Supplementary Textbooks</td><td>-</td></tr>
<tr><td>Credit</td><td>6</td></tr>
<tr><td>Prerequisites of the Course</td><td>There is no prerequisite or co-requisite for this course.</td></tr>
<tr><td>Type of the Course</td><td>Elective</td></tr>
<tr><td>Instruction Language</td><td>Turkish</td></tr>
<tr><td>Course Objectives</td><td>To teach the misconceptions and the misconceptions about the concepts of physics.</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Students know misconceptions, especially in physics.
2. Students diagnose misconceptions,
3. Students use alternative learning methods to eliminate misconceptions.
4. Use effective teaching strategies for overcoming misconceptions.</td></tr>
<tr><td>Mode of Delivery</td><td>The mode of delivery of this course is face to face.</td></tr>
<tr><td>Weekly Schedule</td><td>Week 1: What is misconception?
Week 2: What are common properties of misconceptions?
Week 3: How do misconceptions occur?
Week 4: How to diagnose misconceptions?
Week 5: Which kind of tests can diagnose misconceptions?
Week 6: How to evaluate the misconceptions tests?
Week 7: A project is given for each student about misconception test
Week 8: Misconceptions in the textbooks
Week 9: Alternative teaching strategies to eliminate misconceptions
Week 10: Misconception lists in Physics
Week 11: Misconception lists in Textbooks in Turkey
Week 12: Preparing a sample test to diagnose misconceptions
Week 13: A sample teaching strategy to eliminate misconceptions
Week 14: Assessment.</td></tr>
<tr><td>Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)</td><td>Weekly theoretical course hours: 3
Reading Activities: 14
Internet browsing, library work: 28
Report Preparing: 9
Preparing a Presentation: 6
Presentations: 3
Preparation of Midterm and Midterm Exam: 20
Final Exam and Preparation for Final Exam: 24
Other (should be emphasized): 4</td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th></th><th>Numbers</th><th>Total Weighting (%)</th></tr>
<tr><td>Midterm Exams</td><td>1</td><td>40</td></tr>
<tr><td>Assignment</td><td>-</td><td>-</td></tr>
<tr><td>Application</td><td>-</td><td>-</td></tr>
<tr><td>Projects</td><td>-</td><td>-</td></tr>
<tr><td>Practice</td><td>-</td><td>-</td></tr>
<tr><td>Quiz</td><td>-</td><td>-</td></tr>
<tr><td>Percent of In-term Studies (%)</td><td></td><td>40</td></tr>
</table>
</td></tr>
</table>

Percentage of Final Exam to Total Score (%)		60
Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	-	-	-
Reading Tasks	7	2	14
Studies	7	4	28
Material Design and Implementation			-
Report Preparing	3	3	9
Preparing a Presentation	3	2	6
Presentations	3	1	3
Midterm Exam and Preparation for Midterm Exam	5	4	20
Final Exam and Preparation for Final Exam	6	4	24
Other (should be emphasized)	4	1	4
Total Workload			150
Total Workload / 25			6.00
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.			X		
2	Grasping the inter-disciplinary interaction related to physics education.				X	
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.				X	
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.			X		
5	Solves the issues of physics education by using scientific methods.				X	
6	The ability to carry out a specialist study related to physics education independently.				X	
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.			X		
8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.				X	
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.			X		
10	Evaluates issues related to physics education with a critical eye and encourages learning.				X	
11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.				X	
12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary			X		
13	Having proficiency in a foreign language and establishing written and oral communication with that language	X				
14	Uses computer programs competent enough for related to physics education.				X	
15	Using communication technologies efficiently and according to the needs of the physics education.		X			
16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering					X

		ethical values.					
	17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.				X	
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.			X		

The Course's Lecturer(s) and Contact Information	Name, Surname: Prof. Dr. Bilal GÜNEŞ e-mail: bgunes@gazi.edu.tr

Course Description Form	
Course Code and Name	Misconceptions in Teaching Astronomy
Course Semester	1
Catalog Content	This course provides a basic literacy in astronomy, discusses the basic concepts and misconceptions in astronomy with materials and activities (sky observations etc.) visually supported with theoretical knowledge and practical applications.
Textbook	1-) Karaali, S. (1999). "Genel Astronomi I". İ.Ü.F.F. Yayınları, No:195 2-) Astronomi ve Uzay Bilimleri(1993)Zeki Aslan, Cemal Aydın, Osman Demircan, Ethem Derman ve Halil Kırbıyık
Supplementary Textbooks	
Credit	6
Prerequisites of the Course (Attendance Requirements)	None
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	The aim of this course is to teach the terms, definitions and misconceptions in astronomy that affect current life.
Course Learning Outcomes	1. Students define the terms, concepts and definitions about basic astronomy and indicate the differences between quantities in astronomy. 2. Students state which events are important in history of astronomy in Europeans and Turks. 3. Students examine various cultural interpretations and explore their personal beliefs about the origins of the universe 4. Students solve the problems such as measurement the distance and size of Sun, Moon and Earth etc. of astronomy 5. Students formulate operational definitions of major variables used Kepler and Newton's laws. 6. Students describe and evaluate the design of telescopes, rockets, shuttles, probes and satellites. 7. Students explain the physical characteristics of the sun, planets, and stars. 8. Students explain the features of the blackholes, supernovas and galaxies.
Instruction Methods	Observation, Field Trip to observatory, Lecture, Question & Answer, Demonstration, Drill - Practise
Weekly Schedule	Week 1: Travel to the Depths of the Universe Week 2: Basic Quantities in Astronomy? How to measure distance, mass,etc. in universe? Week 3: Observations of the Sky-Big observatories in the world-Telecopes and Tecnigues of making telescope Week 4: Sun, Earth and Moon Week 5: Solar System, Asteroid Belt ve Meteors-(Our address in the Universe) Week 6: Galaxies- Constellations-Nebulous- Astronomy software programs Week 7: Observation, Field Trip to observatory Week 8: Blackholes Week 9: History of Astronomy and Scientists who contributed to Astronomy-Space Studies Week 10: Evaluation of Stars, Couple Stars and Maps of Star Week 11: Origin and opinions regarding the formation of the universe Week 12: Space Technologies-Communications Satellites and Space Pollution.

	Week 13: Space Technologies in Turkey (TURKSAT, ITUPSAT-1, RASAT etc.) Week 14: Final Exam
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours 3 Weekly applied course hours 0 Reading Activities 14 Internet browsing, library work 14 Designing and implementing materials 28 Report preparing:28 Preparing a Presentation Presentations Preparation of Midterm and Midterm Exam 14 Final Exam and Preparation for Final Exam 14

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	20
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			0
Reading Tasks	14	1	14
Studies	14	1	14
Material Design and Implementation	14	2	28
Report Preparing	14	2	28
Preparing a Presentation			0
Presentations			0
Midterm Exam and Preparation for Midterm Exam	14	1	14
Final Exam and Preparation for Final Exam	14	1	14
Other (should be emphasized)			
Total Workload			154
Total Workload / 25			6.16
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X

		2	Grasping the inter-disciplinary interaction related to physics education.					X	
		3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.				X		
		4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.					X	
		5	Solves the issues of physics education by using scientific methods.					X	
		6	The ability to carry out a specialist study related to physics education independently.					X	
		7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.				X		
		8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X	
		9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.				X		
		10	Evaluates issues related to physics education with a critical eye and encourages learning.					X	

		11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.					X
		12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary				X	
		13	Having proficiency in a foreign language and				X	
		14	establishing written and oral communication with that language	X				
		15	Uses computer programs competent enough for related to physics education.				X	
		16	Using communication technologies efficiently and according to the needs of the physics education.					X
		17	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.				X	
		18	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.					X
The Course's Lecturer(s) and Contact Information	1. Name, Surname: Assoc. Prof. Dr. Uygar KANLI E-mail address: ukanli@gazi.edu.tr							

Course Description Form			
Course Code and Name	Models and Modeling in Physics Education		
Course Semester	1		
Catalog Content	• What is Model and Modeling? • How are Scientific Models Classified? • Analogical Models • Roles of Analogical Models in Physics Education • Mental Models		
Textbook	Scientific articles are followed.		
Supplementary Textbooks	-		
Credit	6		
Prerequisites of the Course	Attendance is compulsory.		
Type of the Course	Elective		
Instruction Language	Turkish		
Course Objectives	The main aim of this course is; to help understand the nature of models and modeling and develop modeling skills.		
Course Learning Outcomes	At the end of the course, it is expected that students who have successfully completed the course will be able to: Realize nature of the models and modeling. Evaluate the models according to certain criteria. Revise some models or build some new models.		
Instruction Methods	This course only is given face to face.		
Weekly Schedule	Week 1: What is a Model? Week 2: How Can Models Be Classified? Week 3: What is Modeling? Why is a model revised or modified? Week 4: Analogical: Models and Their Role in Physics Teaching Week 5: Analogical: Models and Their Role in Physics Teaching Week 6: Mental Models and Features Week 7: Mental Models and Features Week 8: Mental Models and Features Week 9: Pedagogical Analogical Model Development Studies Week 10: Pedagogical Analogical Model Development Studies Week 11: Presentation and Discussion of Developed Models Week 12: Presentation and Discussion of Developed Models Week 13: Presentation and Discussion of Developed Models Week 14: Presentation and Discussion of Developed Models		
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Reading Activities:35 Internet browsing, library work:35 Report preparing:10 Preparing a Presentation:4 Presentations:4 Final Exam and Preparation for Final Exam:20		
Assessment Criteria		Numbers	Total Weighting (%)
	Midterm Exams	-	-
	Assignment	1	40
	Application	-	-
	Projects	-	-
	Practice	-	-
	Quiz	-	-
	Percent of In-term Studies (%)		40
	Percentage of Final Exam to Total Score (%)		60
	Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	-	-	-
Reading Tasks	7	5	35
Studies	7	5	35
Material Design and Implementation			-
Report Preparing	5	2	10
Preparing a Presentation	2	2	4
Presentations	2	2	4
Midterm Exam and Preparation for Midterm Exam			-
Final Exam and Preparation for Final Exam	10	2	20
Other (should be emphasized)			-
Total Workload			150
Total Workload / 25			6.00
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.	x				
2	Grasping the inter-disciplinary interaction related to physics education.		x			
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.					x
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.			x		
5	Solves the issues of physics education by using scientific methods.			x		
6	The ability to carry out a specialist study related to physics education independently.	x				
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.	x				
8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.		x			
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.		x			
10	Evaluates issues related to physics education with a critical eye and encourages learning.				x	
11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.			x		
12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary	x				
13	Having proficiency in a foreign language and establishing written and oral communication with that language	x				
14	Uses computer programs competent enough for related to physics education.			x		
15	Using communication technologies efficiently and according to the needs of the physics education.		x			
16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					x
17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.		x			

	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.				x		
The Course's Lecturer(s) and Contact Information	Name, Surname: Assoc. Prof. Dr. Çağlar GÜLÇİÇEK E-mail address: ukanli@gazi.edu.tr							

<table>
<tr><th colspan="2">Course Description Form</th></tr>
<tr><td>Course Code and Name</td><td>New Approaches in Physics Teaching</td></tr>
<tr><td>Course Semester</td><td>2</td></tr>
<tr><td>Catalog Content</td><td>Learning theories, scientific process skills, constructivist approach and models, laboratory approach, conceptual change texts.</td></tr>
<tr><td>Textbook</td><td>Fen Öğretiminde Yeni Yaklaşımlar, Soylu, H., Nobel Yayın Dağıtım, 2004, Ankara</td></tr>
<tr><td>Supplementary Textbooks</td><td>-</td></tr>
<tr><td>Credit</td><td>6</td></tr>
<tr><td>Prerequisites of the Course
(Attendance Requirements)</td><td>There is no prerequisite or co-requisite for this course.</td></tr>
<tr><td>Type of the Course</td><td>Elective</td></tr>
<tr><td>Instruction Language</td><td>Turkish</td></tr>
<tr><td>Course Objectives</td><td>To recognize new approaches in physics teaching.</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Knows the learning theories.
2. Learn scientific process skills.
3. Knows the constructivist approach.
4. Knows teaching models suitable for constructivist approach.
5. Learns the laboratory approach in physics teaching.
6. Learns conceptual change texts.</td></tr>
<tr><td>Instruction Methods</td><td>Face to face</td></tr>
<tr><td>Weekly Schedule</td><td>Week 1: Science Teaching in Historical Development Process
Week 2: Learning Theories
Week 3: Learning Theories
Week 4: Scientific Process Skills
Week 5: Scientific Process Skills
Week 6: Constructivist approach
Week 7: Constructivist approach
Week 8: 3E, 5E and 7E learning models
Week 9: 3E, 5E and 7E learning models
Week 1: Laboratory use in physics teaching
Week 11: Laboratory use in physics teaching
Week 12: Conceptual change texts
Week 13: Discuss related literature
Week 14: Discuss related literature</td></tr>
<tr><td>Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)</td><td>Weekly theoretical course hours: 3
Weekly applied course hours
Reading Activities:30
Internet browsing, library work:30
Designing and implementing materials
Report preparing:14
Preparing a Presentation: 12
Presentations: 3
Preparation of Midterm and Midterm Exam: 10
Final Exam and Preparation for Final Exam: 10</td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th></th><th>Numbers</th><th>Total Weighting (%)</th></tr>
<tr><td>Midterm Exams</td><td>1</td><td>40</td></tr>
<tr><td>Assignment</td><td></td><td></td></tr>
<tr><td>Application</td><td></td><td></td></tr>
</table>
</td></tr>
</table>

Projects			
Practice			
Quiz			
Percent of In-term Studies (%)		40	
Percentage of Final Exam to Total Score (%)	1	60	
Attendance			

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			0
Reading Tasks	10	3	30
Studies	10	3	30
Material Design and Implementation			0
Report Preparing	7	2	14
Preparing a Presentation	2	6	12
Presentations	1	3	3
Midterm Exam and Preparation for Midterm Exam	2	5	10
Final Exam and Preparation for Final Exam	2	5	10
Other (should be emphasized)			
Total Workload			151
Total Workload / 25			6,04
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research					X
2	Grasping the inter-disciplinary interaction related to physics education					X
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education					X
4	Interpreting and forming new types of					X

		knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines					
	5	Solves the issues of physics education by using scientific methods					X
	6	The ability to carry out a specialist study related to physics education independently			X		
	7	Developing new strategic approaches to solve the unforeseen and complex problems arising in the practical processes					X
	8	Coming up with solutions while taking responsibility				X	
	9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education				X	
	10	Evaluates issues with a critical eye and encourages learning					X
	11	Transferring the current					X

		developments in the physics education and his/her own work within the national and international environments orally, visually and in written forms					
	12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary					X
	13	Having proficiency in a foreign language and establishing written and oral communication with that language	X				
	14	Uses computer programs competent enough for physics education				X	
	15	Using communication technologies efficiently and according to the needs of the physics education					X
	16	Collects data related to the physics education, reviews and makes conclusions; implements and					X

		shares them by considering ethical values					
	17	Develops different perspectives related to the physics education, plans them and assesses them within the quality framework				X	
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies			X		
The Course's Lecturer(s) and Contact Information	1. Name, Surname : Prof. Dr. Musa SARI E-mail address: msari@gazi.edu.tr						

Course Description Form	
Course Code and Name	Nuclear Energy
Course Semester	2
Catalog Content	Fission, Fusion, Nuclear Reactors, Nuclear fuel and radioactive wastes
Textbook	Elements of Nuclear Physics W.E.Meyerhof (McGraw –Hill ,USA), 1967
Supplementary Textbooks	Introduction to Nuclear Engineering J.R.Lamarsh,A.J.Baratta (Addison Wesley),2001
Credit	6
Prerequisites of the Course	There is no prerequisite or co-requisite for this course.
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Teaching the basic concepts of radiation, nuclear decay and detailed information about their usage areas.
Course Learning Outcomes	1. Students learn nuclear science and technology used in nuclear reactors. 2. Students know the strategic importance of nuclear energy for countries. 3. Students learn nuclear energy mechanisms and concepts.
Mode of Delivery	The mode of delivery of this course is face to face.
Weekly Schedule	Week 1: Introduction to nuclear energy. Week 2: Principles of nuclear energy. Week 3: Nuclear reactions. Week 4: Fission. Week 5: Controlled fission. Week 6: Fusion. Week 7: Nuclear power reactors. Week 8: Types of reactors and Uranium wealthy. Week 9: Nuclear security principles Week 10: Radioactive rubbish. Week 11: Nuclear power central accidents. Week 12: Pollution. Week 13: Some systems related to nuclear technology. Week 14: Nuclear energy policies.
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Reading Activities:20 Internet browsing, library work:27 Preparation of Midterm and Midterm Exam:24 Final Exam and Preparation for Final Exam:32 Other (should be emphasized):5

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	40
Assignment	-	-
Application	-	-
Projects	-	-
Practice	-	-
Quiz	-	-
Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	-	-	-
Reading Tasks	10	2	20
Studies	9	3	27
Material Design and Implementation			-
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preparation for Midterm Exam	6	4	24
Final Exam and Preparation for Final Exam	8	4	32
Other (should be emphasized)	5	1	5
Total Workload			150
Total Workload / 25			6.00
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics education.					X
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.				X	
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.			X		
5	Solves the issues of physics education by using scientific methods.			X		
6	The ability to carry out a specialist study related to physics education independently.					X
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.					X
8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.			X		
10	Evaluates issues related to physics education with a critical eye and encourages learning.				X	
11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.				X	
12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary			X		
13	Having proficiency in a foreign language and establishing written and oral communication with that language			X		
14	Uses computer programs competent enough for related to physics education.				X	
15	Using communication technologies efficiently and according to the needs of the physics education.		X			
16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					X
17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.				X	

	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.			X		
The Course's Lecturer(s) and Contact Information	Name, Surname: Assoc. Prof. Dr. Mustafa Güray BUDAK E-mail address: ukanli@gazi.edu.tr						

Course Description Form	
Course Code and Name	Out of School Learning Environments
Course Semester	2
Catalog Content	Out-of-school learning environments course content; information about informal learning environments, field trips and the importance of museums in education and how they are directed. This course includes extracurricular, zoo, library, science museum and science centers.
Textbook	• Okul Duvarlarının Ötesinde Öğrenme Yolculuğu: Bilim-Teknoloji Merkezleri ve Bilim Müzeleri Editör: Fitan Köseoğlu Editör Yardımcısı: Uygar Kanlı. Nobel Yayınevi • Okul Dışı Öğrenme Ortamları Editör(ler): Ahmet İlhan Şen Pegem Kitabevi
Supplementary Textbooks	
Credit	6
Prerequisites of the Course (Attendance Requirements)	No
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	The aim of this course is to teach prospective teachers how to use out-of-school learning environments in education / training
Course Learning Outcomes	• Explain the importance of out-of-school learning environments in education / training • Explain the differences between out-of-school learning environments and formal education • Understands how to use out-of-school learning environments. • Develop appropriate educational materials to create effective out-of-school teaching and learning processes. • Create a plan for the use of out-of-school environments for learning / teaching purposes, manage the implementation process and foresee advantages and disadvantages. • Compares the out-of-school learning environment of different countries
Instruction Methods	Lecture, Question & Answer, Demonstration, Drill - Practise
Weekly Schedule	Week 1: Course introduction Week 2: Introduction of formal and informal learning environments. Week 3: Use of out-of-school learning environments in education Week 4: Importance and use of science and natural history museums in education Week 5: Importance and use of out-of-school environments such as Science Center, zoo, library, botanical garden in education Week 6: Creating a plan for the use of out-of-school settings for learning and teaching. Week 7: Planning activities and methods for using out-of-school environments for learning and teaching purposes. Week 8: Discussing the advantages and disadvantages of out-of-school settings. Week 9: Developing appropriate educational materials to build out-of-school teaching and learning processes. Week 10: Out-of-school environments for learning purposes and evaluation of the implementation process management Week 11: Developing appropriate educational materials to create effective out-of-school teaching and learning processes. Week 12: Field trips, exhibitions and so on. layouts. Week 13: Comparison of different countries' out-of-school learning environments and usage examples. Week 14: Comparison of different countries' out-of-school learning environments and usage examples.

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 3
Weekly applied course hours :0
Reading Activities: 42
Internet browsing, library work 42
Designing and implementing materials
Report preparing: 6
Preparing a Presentation: 6
Presentations: 3
Preparation of Midterm and Midterm Exam: 6
Final Exam and Preparation for Final Exam: 6

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	20
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)	2	40
Percentage of Final Exam to Total Score (%)	1	60
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	14	3	42
Studies	14	3	42
Material Design and Implementation			
Report Preparing	6	1	6
Preparing a Presentation	6	1	6
Presentations	1	3	3
Midterm Exam and Preparation for Midterm Exam	6	1	6
Final Exam and Preparation for Final Exam	6	1	6
Other (should be emphasized)			
Total Workload			153
Total Workload / 25			6.12
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics					X

			education.						
		3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.						
		4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.					X	
		5	Solves the issues of physics education by using scientific methods.					X	
		6	The ability to carry out a specialist study related to physics education independently.					X	
		7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.				X		
		8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X	
		9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.					X	
		10	Evaluates issues related to physics education with a critical eye and encourages learning.						
		11	Transferring the current					X	

			developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.						
		12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary			X			
		13	Having proficiency in a foreign language and establishing written and oral communication with that language			X			
		14	Uses computer programs competent enough for related to physics education.	X					
		15	Using communication technologies efficiently and according to the needs of the physics education.			X			
		16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					X	
		17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.				X		
		18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with					X	

	interdisciplinary studies.
The Course's Lecturer(s) and Contact Information	1. Name, Surname: Assoc. Prof. Dr. Uygar KANLI E-mail address: ukanli@gazi.edu.tr

<table>
<tr><th colspan="2">Course Description Form</th></tr>
<tr><td>Course Code and Name</td><td>PhD Seminar</td></tr>
<tr><td>Course Semester</td><td>2</td></tr>
<tr><td>Catalog Content</td><td>In this course, students are aimed to research the studies in the field of Physics Education, to review the literature and to prepare for the thesis they will prepare.</td></tr>
<tr><td>Textbook</td><td>1.Büyüköztürk, Ş. (2009). Sosyal Bilimler İçin Veri Analiz El Kitabı (10. Baskı) --</td></tr>
<tr><td>Supplementary Textbooks</td><td>-</td></tr>
<tr><td>Credit</td><td>5</td></tr>
<tr><td>Prerequisites of the Course</td><td>None</td></tr>
<tr><td>Type of the Course</td><td>Compulsory</td></tr>
<tr><td>Instruction Language</td><td>Turkish</td></tr>
<tr><td>Course Objectives</td><td>In this course, it is aimed that the students thoroughly research the studies in the field of Physics Education and prepare for the thesis they will prepare.</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Researches some topics that will guide the thesis study.
2. Makes a detailed literature research on the chosen topic.
3. Collects data with scientific method, reports and presents according to the thesis writing rules.
4. Gains experience in preparing a thesis on physics education and evaluating the results.</td></tr>
<tr><td>Mode of Delivery</td><td>The mode of delivery of this course is face to face.</td></tr>
<tr><td>Weekly Schedule</td><td>Week 1: To inform the students about the course and the topics to be researched.
Week 2: Determining the topics that students choose / can choose as the subject of the seminar.
Week 3: Determining the topics that students choose / can choose as the subject of the seminar.
Week 4: Examining the researches and the preparations they have made on the topics chosen by the students.
Week 5: Examining the researches and the preparations they made about the topics chosen by the students.
Week 6: Making presentations about the topics chosen by the students.
Week 7: Making presentations about the topics chosen by the students.
Week 8: Making presentations about the topics chosen by the students.
Week 9: Making presentations about the topics chosen by the students.
Week 10: Making presentations about the topics chosen by the students.
Week 11: Making presentations about the topics chosen by the students.
Week 12: Making presentations about the topics chosen by the students.
Week 13: Making presentations about the topics chosen by the students.
Week 14: A general evaluation is made on the topics discussed.</td></tr>
<tr><td>Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)</td><td>Weekly practice class hours: 2
Reading Activities:24
Internet browsing, library work:21
Preparing a Presentation:18
Presentations:16
Preparation of Midterm and Midterm Exam:3
Final Exam and Preparation for Final Exam:14
Other (should be emphasized):4</td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th></th><th>Numbers</th><th>Total Weighting (%)</th></tr>
<tr><td>Midterm Exams</td><td>-</td><td>-</td></tr>
<tr><td>Assignment</td><td>1</td><td>40</td></tr>
<tr><td>Application</td><td>-</td><td>-</td></tr>
<tr><td>Projects</td><td>-</td><td>-</td></tr>
<tr><td>Practice</td><td>-</td><td>-</td></tr>
<tr><td>Quiz</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
</table>

Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour	Total Period Work Load
Weekly Theoretical Course Hours	-	-	
Weekly Tutorial Hours	14	2	28
Reading Tasks	12	2	24
Studies	7	3	21
Material Design and Implementation			-
Report Preparing			
Preparing a Presentation	9	2	18
Presentations	8	2	16
Midterm Exam and Preparation for Midterm Exam	3	1	3
Final Exam and Preparation for Final Exam	7	2	14
Other (should be emphasized)	2	2	4
Total Workload			128
Total Workload / 25			5.12
Course Credit (ECTS)			5

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.		X			
2	Grasping the inter-disciplinary interaction related to physics education.				X	
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.				X	
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.					X
5	Solves the issues of physics education by using scientific methods.				X	
6	The ability to carry out a specialist study related to physics education independently.				X	
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.					X
8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.				X	
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.				X	
10	Evaluates issues related to physics education with a critical eye and encourages learning.					X
11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.			X		
12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary		X			
13	Having proficiency in a foreign language and establishing written and oral communication with that language	X				
14	Uses computer programs competent enough for related to physics education.	-				
15	Using communication technologies efficiently and according to the needs of the physics education.			X		
16	Collects data related to physics education, reviews and makes					X

		conclusions; implements and shares them by considering ethical values.						
	17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.				X		
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.				X		
The Course's Lecturer(s) and Contact Information	Name, Surname: e-mail:							

Course Description Form	
Course Code and Name	Qualitative Research Methods in Physics Education
Course Semester	2
Catalog Content	The aim of this course is to teach students qualitative research methods used in social/educational sciences. After the introductory topics, hypothesis development, data collection, data analysis and interpretation will be covered based on the qualitative method.
Textbook	Research Design, by J.W. Creswell Sage Publications 2008 Nitel Araştırma Yöntemleri, John W. Creswell, Siyasal Kitabevi Araştırma Deseni Nitel, Nicel ve Karma Yöntem Yaklaşımları John W. Creswell
Supplementary Textbooks	Karma Yöntem Araştırmalarına Giriş-John W. Creswell Pegem Akademi Yayincilik Karma Yöntem Araştırmaları Tasarımı ve Yürütülmesi John W. Creswell , Vicki L. Plano Clark Ani Yayincilik
Credit	6
Prerequisites of the Course (Attendance Requirements)	None
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	i) To develop the ability to evaluate research from different perspectives in social sciences (positivism, interpretation, etc.) ii) Giving information about qualitative research methods and the philosophical structure on which it is based iii) To gain in-depth knowledge about the application of qualitative research method.
Course Learning Outcomes	i) To develop the ability to evaluate research from different perspectives in social sciences (positivism, interpretation, etc.) ii) Giving information about qualitative research methods and the philosophical structure on which it is based iii) To gain in-depth knowledge about the application of qualitative research method.
Instruction Methods	Students can obtain • to have knowledge about qualitative research methods and philosophical structure in social sciences • to describe the qualitative research problem and develop a theoretical framework related to the researched variables. • to be able to apply techniques on qualitative research method
Weekly Schedule	Week 1: Information and Guidance about the Course Week 2: Introduction to qualitative research methods and philosophical approaches Week 3: Establishment and design of a qualitative research hypothesis Week 4: Preparation of the research proposal and development of theories Week 5: Relationship between the research proposal and the research design Week 6: Collection of data in a qualitative research Week 7: Analysis of the data in a qualitative research Week 8: Analysis of the data in a qualitative research Week 9: week Literature research and discussion of articles about qualitative studies Week 10: Literature research and discussion of articles about qualitative studies Week 11: Qualitative data analysis Week 12: Qualitative data analysis Week 13: Interpretation of Qualitative Data Week 14: Interpretation of Qualitative Data

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 3
Weekly applied course hours :0
Reading Activities: 36
Internet browsing, library work 12
Designing and implementing materials:0
Report preparing: 12
Preparing a Presentation: 12
Presentations: 12
Preparation of Midterm and Midterm Exam: 12
Final Exam and Preparation for Final Exam:12

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	25
Assignment	4	25
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		50
Percentage of Final Exam to Total Score (%)		50
Attendance		0

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			0
Reading Tasks	12	3	36
Studies	12	1	12
Material Design and Implementation			0
Report Preparing	3	4	12
Preparing a Presentation	3	4	12
Presentations	3	4	12
Midterm Exam and Preparation for Midterm Exam	1	12	12
Final Exam and Preparation for Final Exam	1	12	12
Other (should be emphasized)			0
Total Workload			150
Total Workload / 25			6,00
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics					X

			education.						
		3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.					X	
		4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.					X	
		5	Solves the issues of physics education by using scientific methods.					X	
		6	The ability to carry out a specialist study related to physics education independently.					X	
		7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.					X	
		8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X	
		9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.					X	
		10	Evaluates issues related to physics education with a critical eye and encourages learning.					X	
		11	Transferring the current						

			developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.						
		12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary					X	
		13	Having proficiency in a foreign language and					X	
		14	establishing written and oral communication with that language		X				
		15	Uses computer programs competent enough for related to physics education.		X				
		16	Using communication technologies efficiently and according to the needs of the physics education.			X			
		17	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					X	
		18	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.					X	
The Course's Lecturer(s) and Contact Information	1. Name, Surname: Assoc. Prof. Dr. Uygar KANLI E-mail address: ukanli@gazi.edu.tr								

Course Description Form	
Course Code and Name	Radiation Physics
Course Semester	1
Catalog Content	Atomic Nucleus, Radiation Concept and Radioactivity, Ionizing and Non-Ionizing Radiations, Radiation Units, Neutrons and Its Interactions with Matter, Radiation Detectors, Nuclear Energy
Textbook	Physics for Radiation Protection: A Handbook. James E. Martin, 2006 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim ISBN: 3-527-406115. http://onlinelibrary.wiley.com/book/10.1002/9783527618798
Supplementary Textbooks	
Credit	6
Prerequisites of the Course (Attendance Requirements)	There is no prerequisite or co-requisite for this course
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Teaching the basic concepts of radiation, nuclear decay and detailed information about their usage areas.
Course Learning Outcomes	1. Learn general properties of the nucleus and concept of the radiation. 2. Distinguish atomic and nuclear radiation, understand the formation and classification. 3. Learn types of radiation, radioisotopes and radioactive decays. 4. Distinguish natural and artificial radioactivity. 5. Classify the radiation according to ionizing properties. 6. Learn the units used to measure radiation. 7. Understand the interaction of radiation with matter. 8.Understand the methods of radiation measurement and the working principles of radiation detectors. 9. Recognize the biological effects of radiation and the importance of radiation protection. 10. Learn the nuclear binding energy and the obtaining methods of nuclear energy.
Instruction Methods	This course will face-to-face training
Weekly Schedule	Week 1: General properties of the atom and the nucleus: structure, mass, size, magnetic moment, mass number, isotope, isoton, isobar, etc.. Week 2: The concept of radiation, types, atomic and nuclear radiation: electromagnetic waves, alpha, beta, and other accelerated charged particles, neutrons. Week 3: Radiations caused by radioactivity, half-life, activity, alpha, beta and gamma decays. Week 4: Natural and artificial radioactivity: applications of the natural radioactivity, the C-14 dating, the production of artificial radioisotopes, used in Week 5: Ionizing and non-ionizing radiations: low-energy electromagnetic waves, x-rays, gamma rays, and charged particles. Week 6: The units used to measure radiation: Becquerel, Curie, Rutherford, Rontgen, Rad, Sievert, Rem, etc. Week 7: Charged particles (light and heavy) interaction with matter: Bremsstrahlung and Cerenkov radiations. Week 8: Gamma and X-rays (electromagnetic waves) interaction with matter: photoelectric effect, Compton effect, and pair production. Week 9: The interaction of fast neutrons with matter, slowing down and shielding. Week 10: The methods of radiation measurement and principles of radiation detectors.

	Week 11: Ionization chamber, Geiger-Müller counter, proportional counter, scintillation and semiconductor detectors. Week 12: The biological effects of radiation and the importance of the radiation protection. Week 13: Nuclear binding energy, nuclear reaction, cross section. Week 14: Methods to obtain nuclear energy: fission and fusion.
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Reading Activities: 20 Internet browsing, library work: 27 Preparation of Midterm and Midterm Exam: 24 Final Exam and Preparation for Final Exam: 32 Other (should be emphasized):5

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	40
Assignment		
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	10	2	20
Studies	9	3	27
Material Design and Implementation			
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for Midterm Exam	6	4	24
Final Exam and Preperation for Final Exam	8	4	32
Other (should be emphasized)	5	1	5
Total Workload			150
Total Workload / 25			6.00
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to					X

	physics education.						
2	Grasping the inter-disciplinary interaction related to physics education.				X		
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.				X		
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.			X			
5	Solves the issues of physics education by using scientific methods.			X			
6	The ability to carry out a specialist study related to physics education independently.			x			
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.				X		
8	Coming up with solutions while taking responsibility dealing with unforeseen and complex				X		

	problems related to physics education.						
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.				X		
10	Evaluates issues related to physics education with a critical eye and encourages learning.			X			
11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.			X			
12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary			x			
13	Having proficiency in a foreign language and establishing written and oral communication with that language			x			
14	Uses computer programs competent enough for related to physics education.				X		

	15	Using communication technologies efficiently and according to the needs of the physics education.		X				
	16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					X	
	17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.				X		
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.			x			
The Course's Lecturer(s) and Contact Informations	1. Name, Surname : Prof. Dr. Mustafa KARADAĞ E-mail address : mkaradag@gazi.edu.tr							

Course Description Form	
Course Code and Name	Research Methods in Science Education
Course Semester	1
Catalog Content	To provide students with the knowledge and skills they need to have during the thesis proposal and thesis writing stages.
Textbook	• Bilimsel Araştırma Yöntemleri Şener Büyüköztürk , Yrd. Doç. Dr. Özcan Aygün , Ebru Kılıç Çakmak , Şirin Karadeniz –Pegem Akademi Yayıncılık- • Araştırma Deseni Nitel, Nicel Ve Karma Yöntem Yaklaşımları John W. Creswell
Supplementary Textbooks	• Nitel Araştırma Yöntemleri John W. Creswell Siyasal Kitabevi • Karma Yöntem Araştırmalarına Giriş-John W. Creswell Pegem Akademi Yayincilik • Karma Yöntem Araştırmaları Tasarımı Ve Yürütülmesi John W. Creswell , Vicki L. Plano Clark Ani Yayincilik
Credit	6
Prerequisites of the Course (Attendance Requirements)	None
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	The aim of this course is to analyze the main scientific research methods and to provide the necessary acquisition to carry out and carry out thesis studies in physics education.
Course Learning Outcomes	• Know the methods of scientific research. • Learn the basic features of the scientific research. • Learn the methods of data collection. • Learn the investigation methods of variables and assessment approaches. • Make a literature review on any subject.
Instruction Methods	Lecture, Question and Answer, Demonstration, Drill - Practise, Research
Weekly Schedule	Week 1: Basic concepts in research Science and research Week 2: Basic concepts in research Science and research Week 3. The basic properties in research and aims Week 4: The procedures in research the types of research Week 5: The procedures in research the types of research Week 6: The investigation methods of variables Week 7: Midterm exam Week 8: The reliability of research results Week 9: The reliability of research results Week 10: The testing of the result the methods of data collection Week 11: The testing of the result the methods of data collection Week 12: The testing of the result the methods of data collection Week 13: The testing of the result the methods of data collection Week 14: Literature review methods
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Weekly applied course hours :0 Reading Activities: 42 Internet browsing, library work 42 Designing and implementing materials Report preparing: 6 Preparing a Presentation: 6 Presentations: 3 Preparation of Midterm and Midterm Exam: 6 Final Exam and Preparation for Final Exam: 6

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	20
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)	2	40
Percentage of Final Exam to Total Score (%)	1	60
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	14	3	42
Studies	14	3	42
Material Design and Implementation			
Report Preparing	6	1	6
Preparing a Presentation	6	1	6
Presentations	1	3	3
Midterm Exam and Preparation for Midterm Exam	6	1	6
Final Exam and Preparation for Final Exam	6	1	6
Other (should be emphasized)			
Total Workload			153
Total Workload / 25			6,12
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics education.					X
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.					
4	Interpreting and forming new types of knowledge by					X

			combining the knowledge from the physics education and the knowledge from various other disciplines.						
		5	Solves the issues of physics education by using scientific methods.					X	
		6	The ability to carry out a specialist study related to physics education independently.					X	
		7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.				X		
		8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X	
		9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.					X	
		10 11	Evaluates issues related to physics education with a critical eye and encourages learning. Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.					X	
		12	Ability to see and develop social				X		

			relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary						
		13	Having proficiency in a foreign language and establishing written and oral communication with that language			X			
		14	Uses computer programs competent enough for related to physics education.	X					
		15	Using communication technologies efficiently and according to the needs of the physics education.			X			
		16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					X	
		17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.				X		
		18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.					X	
The Course's Lecturer(s) and Contact Information	1. Name, Surname: Assoc. Prof. Dr. Uygar KANLI E-mail address: ukanli@gazi.edu.tr								

Course Description Form	
Course Code and Name	Scientific Research Methods and Ethics
Course Semester	1
Catalog Content	Basic concepts of scientific research methods, ethical principles, scientific research principles, methods and techniques, scientific research proposal stages.
Textbook	Büyüköztürk, Ş. ve diğerleri (2018) Bilimsel Araştırma Yöntemleri. Ankara Pegem Akademi Yayıncılık. Kırbaş, D. & Ekim Çevik, F. (2017). Bilimsel Araştırma Yöntemleri ve Araştırma Etiği. İstanbul: Nobel Tıp Kitabevi Arıkan, R. (2000). Araştırma Teknikleri ve Rapor Yazma. Ankara: Gazi Kitabevi Cebeci, S. (2015). Bilimsel Araştırma ve Yazma Teknikleri. İstanbul: Alfa Yayınları
Supplementary Textbooks	Yıldırım, H. & Şimşek, H. (2008). Sosyal Bilimlerde Nitel Araştırma Yöntemleri. Ankara: Seçkin. Erkuş, A. (2017). Davranış Bilimleri İçin Bilimsel Araştırma Yöntemleri. Ankara: Seçkin. Day, R.A. (1996). Bilimsel Makale Nasıl Yazılır, Nasıl Yayımlanır? Ankara: Tübitak Hafner, A.W. (1998). Descriptive Statistical Techniques for Librarians. Chicago.
Credit	6
Prerequisites of the Course (Attendance Requirements)	There is no prerequisite or co-requisite for this course.
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Recognition of scientific research principles and methods and their effective use in the research process.
Course Learning Outcomes	1. Recognizes scientific research principles and methods, 2. Determines the method and technique suitable for the purpose of the study subject, 3. Applies ethical principles in scientific research processes, 4. Designs a research proposal in the related field.
Instruction Methods	This course only is given face to face.
Weekly Schedule	Week 1: Knowledge of basic concepts about research (Science, scientific method), Week 2: Knowledge of scientific research and scientific research processes (Research methodology, topic determination, problem definition, problem choice, purpose, importance, limitations), Week 3: Preparing a research proposal, Week 4: Method (Research model and types), Week 5: Universe and sample (Definition and types) Week 6: Collection of data (Definition, types and sources), Week 7: Data collection techniques (Observation, survey, interview, document scanning) Week 8: Technical characteristics of the measuring tool / Processing, solution and interpretation of data, Week 9: Summary, judgment and suggestions and report writing, Week 10: Basic information about the concept of ethics, Week 11: Ethical violations and unethical behavior. Publication ethics and basic principles. Unethical behavior and ethical violations in the publishing process. Authorship issues.

	Bilateral publication / Editorial ethical evaluation of academic publications in terms of ethics, Week 12: Research ethics committees / Examination of examples against publication ethics, Week 13: Research Ethics Week 14: Writing reports in accordance with scientific writing rules,
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Weekly applied course hours Reading Activities: 13 Internet browsing, library work Designing and implementing materials Report preparing: 18 Preparing a Presentation: 18 Presentations: 18 Preparation of Midterm and Midterm Exam: 12 Final Exam and Preparation for Final Exam: 12

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	40
Assignment		
Application	3	60
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		60
Percentage of Final Exam to Total Score (%)		40
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			0
Reading Tasks	13	3	39
Studies			0
Material Design and Implementation			0
Report Preparing	3	6	18
Preparing a Presentation	3	6	18
Presentations	3	6	18
Midterm Exam and Preparation for Midterm Exam	1	12	12
Final Exam and Preparation for Final Exam	1	12	12
Other (should be emphasized)			0
Total Workload			159
Total Workload / 25			6.36
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes	No	Program Outcomes	1	2	3	4	5
	1	Course develops student's skills of expression and research					
	2	Grasping the inter-disciplinary interaction related to physics education					
	3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education					
	4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines					
	5	Solves the issues of physics education by using scientific methods					x
	6	The ability to carry out a specialist study related to physics education independently					
	7	Developing new strategic approaches to solve the unforeseen and complex					

		problems arising in the practical processes					
	8	Coming up with solutions while taking responsibility					
	9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education					
	10	Evaluates issues with a critical eye and encourages learning			x		
	11	Transferring the current developments in the physics education and his/her own work within the national and international environments orally, visually and in written forms					
	12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary					
	13	Having proficiency in a foreign language and			x		

		establishing written and oral communication with that language					
	14	Uses computer programs competent enough for physics education			x		
	15	Using communication technologies efficiently and according to the needs of the physics education					
	16	Collects data related to the physics education, reviews and makes conclusions; implements and shares them by considering ethical values					
	17	Develops different perspectives related to the physics education, plans them and assesses them within the quality framework					
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies					

The Course's Lecturer(s) and Contact Information	1. Name, Surname: Assoc. Prof. Dr. Hasan Şahin KIZILCIK E-mail address: ukanli@gazi.edu.tr

Course Description Form	
Course Code and Name	Selected Topics in Physics
Course Semester	1
Catalog Content	The content of this inverse constitutes the content of this reversal in the undergraduate education period by identifying the physics issues that students do not see due to their time limitation or absence in the curriculum according to their wishes (superconductivity, nanotechnology, crystallography etc.).
Textbook	Different physics textbooks
Supplementary Textbooks	-
Credit	6
Prerequisites of the Course	None
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	The aim of this course is to explain the physics subjects that students do not see due to time limitation and not being in the curriculum during the undergraduate education period and to gain new knowledge and skills.
Course Learning Outcomes	Students who successfully complete this course; 1) Complements the physics subjects that are missing in undergraduate education. 2) Learns the chosen physics subjects in detail. 3) Makes detailed research on the chosen topics.
Mode of Delivery	The mode of delivery of this course is face to face.
Weekly Schedule	Week 1: Introduction of the course and determination of the physics topics to be explained with the students (Mechanical, Electric and Magnetism, etc.) Week 2: The topics that students want to be explained are listed in a certain order and students are asked to conduct research on the topics. Week 3: Next issue is explained Week 4: Next issue is explained Week 5: Next issue is explained Week 6: Next issue is explained Week 7: Next issue is explained Week 8: Next issue is explained Week 9: Next issue is explained Week 10: Next issue is explained Week 11: Next issue is explained Week 12: Next issue is explained Week 13: Next issue is explained Week 14: A general evaluation is made on the topics explained.
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Reading Activities:24 Internet browsing, library work:36 Preparing a Presentation:14 Presentations:14 Preparation of Midterm and Midterm Exam:5 Final Exam and Preparation for Final Exam:10 Other (should be emphasized):4

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	40
Assignment	-	-
Application	-	-
Projects	-	-
Practice	-	-

Quiz	-	-
Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	-	-	-
Reading Tasks	12	2	24
Studies	12	3	36
Material Design and Implementation			-
Report Preparing			
Preparing a Presentation	7	2	14
Presentations	7	2	14
Midterm Exam and Preparation for Midterm Exam	5	1	5
Final Exam and Preparation for Final Exam	5	2	10
Other (should be emphasized)	2	2	4
Total Workload			149
Total Workload / 25			5.96
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics education.				X	
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.					X
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.				X	
5	Solves the issues of physics education by using scientific methods.			X		
6	The ability to carry out a specialist study related to physics education independently.					X
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.					X
8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.				X	
10	Evaluates issues related to physics education with a critical eye and encourages learning.					X
11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.			X		
12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary		X			
13	Having proficiency in a foreign language and establishing written and oral communication with that language	X				
14	Uses computer programs competent enough for related to physics education.	X				
15	Using communication technologies efficiently and according to the needs of the physics education.		X			

	16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.			X		
	17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.					X
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.					X
The Course's Lecturer(s) and Contact Information	Name, Surname: Prof. Dr. Musa SARI e-mail: msari@gazi.edu.tr						

Course Description Form	
Course Code and Name	Statistical Data Analysis
Course Semester	2
Catalog Content	The course is an introduction to quantitative methods for research in social and behavioral sciences. Students will examine the basic concepts and procedures of descriptive and inferential statistics. Students will develop competence in reading and understanding statistical topics from sources such as theses, articles or reports. The course also includes an introduction to the use and interpretation of SPSS.
Textbook	1. Sosyal Bilimler için Veri Analizi El Kitabı İstatistik, Araştırma Deseni SPSS Uygulamaları ve Yorum- Şener Büyüköztürk Yayınevi: Pegem Akademi Yayıncılık 2. SPSS uygulamalı Çok Değişkenli İstatistik Teknikleri-Şeref Kalaycı-Asil Yayın Dağıtım 3. SPSS kullanma kılavuzu Julie Pallant Çeviri: Sibel Balcı-Berat Ahi Anı yayıncılık 4. İstatistiğe Giriş-Nilgün Köklü-Şener Büyüköztürk-Pegem Yayıncılık
Supplementary Textbooks	
Credit	6
Prerequisites of the Course (Attendance Requirements)	To have taken a course on research methods.
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	The aim of this course is data collection, coding, sampling, organizing data, comparing, predicting and programming.
Course Learning Outcomes	• Students build up knowledge of statistical methods used for data analysis. • Students distinguish the difference among the statistical methods. • Students perform computer-aided data analysis using SPSS. • Students analyse and interpret data skillfully.
Instruction Methods	This course will face-to-face training
Weekly Schedule	Week 1: Introduction to Statistics Week 2: Data Types and experimental design Week 3: Descriptive Statistical Procedures Week 4: Hypothesis Testing Week 5: Hypothesis Testing Week 6: Parametric Hypothesis Testing Comparing means: T-tests Week 7: Parametric Hypothesis Testing One Way ANOVA Analysis Two-way ANOVA Analysis Week 8: Nonparametric Hypothesis Testing Week 9: Nonparametric Hypothesis Testing Week 10: Correlation Analysis Week 11: Analysis of Variance Analysis of covariance Week 12: Factor Analysis Week 13: Applications with Statistical Software Packages Week 14: Final exam
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours:2 Weekly applied course hours:1 Reading Activities:2 Internet browsing, library work:2 Designing and implementing materials:0 Report preparing:7 Preparing a Presentation:3 Presentations:3 Preparation of Midterm and Midterm Exam:12

	Final Exam and Preparation for Final Exam:12

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	20
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)	2	40
Percentage of Final Exam to Total Score (%)	1	60
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	14	3	42
Studies	14	3	42
Material Design and Implementation			
Report Preparing	6	1	6
Preparing a Presentation	6	1	6
Presentations	1	3	3
Midterm Exam and Preparation for Midterm Exam	6	1	6
Final Exam and Preparation for Final Exam	6	1	6
Other (should be emphasized)			
Total Workload			153
Total Workload / 25			6,12
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics education.					X

	3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.					X	
	4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.					X	
	5	Solves the issues of physics education by using scientific methods.					X	
	6	The ability to carry out a specialist study related to physics education independently.					X	
	7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.					X	
	8	Coming up with solutions while taking responsibility dealing with unforeseen and complex problems related to physics education.					X	
	9	Fulfilling the leader role in the environments where solutions			X			

	are sought for the problems related to physics education.						
10	Evaluates issues related to physics education with a critical eye and encourages learning.			X			
11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.				X		
12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary				X		
13	Having proficiency in a foreign language and			X			
14	establishing written and oral communication with that language				X		
15	Uses computer programs competent enough for related to physics education.		X				
16	Using communication technologies efficiently and according to the needs of the physics education.					X	

	17	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					X	
	18	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.					X	
The Course's Lecturer(s) and Contact Information	1. Name, Surname: Assoc. Prof. Dr. Uygar KANLI E-mail address: ukanli@gazi.edu.tr							

Course Description Form	
Course Code and Name	Teaching Basic Concepts in Physics Education
Course Semester	2
Catalog Content	Mechanics 1 (Motion, Laws of Motion, Applications of Laws of Motion, Work and energy); Mechanics 2 (Energy and conservation, Linear Momentum, Dynamics of solid bodies); Electric 1 (Electric charge, Electric Field, electrical potential, Capacitance, current and resistance); Electric 2 (magnetic field and magnetic field sources, Faraday's law, Self-induction, Alternating current circuits, Electromagnetic waves).
Textbook	Serway I-II, Fiziğin Temelleri I-II, Temel Fizik I, II, Lise Fizik Ders Programları
Supplementary Textbooks	-
Credit	6
Prerequisites of the Course	There is no prerequisite or co-requisite for this course.
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	To teach students basic concepts related to mechanics and electricity at undergraduate level in detail.
Course Learning Outcomes	1. Shows the effect-reaction force pairs on various examples, such as "a ball hanging from the ceiling with a weightless rope". 2. Shows that vector operations are independent from coordinate axes by making vector operations on different coordinate axes. 3. Explains the concepts of position, displacement, average velocity by drawing shapes in one dimensional motion. 4. Makes the physical definition of the derivative by using analytical thinking skill. 5. Comprehends that the radian is unitary, but that it describes a spring length. 6. Based on different examples such as ice skating, he realizes that “angular momentum will be preserved unless an external force acts”. 7. Explain the working principle of the lightning rod based on the rule of collecting electric charges at the sharp ends of the conductor. 8. Explains the working principle of microwave ovens based on the concepts of electric dipole and dipole moment. 9. Explains Maxwell Equations conceptually. 10. Using progressive wave equations, it indicates that the light is an electromagnetic wave with E and B that travel at the speed of light c.
Mode of Delivery	The mode of delivery of this course is face to face.
Weekly Schedule	Week 1: Students discuss the concepts of Mechanics 1 (Movement), they are informed about how to explain these concepts to their students. Week 2: Students discuss the concepts of Mechanics 1 (Laws of Motion), they are informed about how to explain these concepts to their students. Week 3: Students discuss the concepts of Mechanics 1 (Laws of Motion), they are informed about how to explain these concepts to their students. Week 4: Students discuss the concepts of mechanics (work and energy), they are informed about how to explain these concepts to their students. Week 5: Students discuss the concepts of Mechanics 2 (Energy and conservation), they are informed about how to explain these concepts to their students. Week 6: Students discuss the concepts of Mechanics 2 (Linear Momentum, Dynamics of Rigid Bodies), they are informed about how to explain these concepts to their students. Week 7: Students discuss the concepts of Electricity 1 (Electric charge, Electric Field, electrical potential), they are informed about how to explain these concepts to their students. Week 8: Students discuss the concepts of Electricity 1 (Capacitance, current and resistance), they are informed about how to explain these concepts to their students. Week 9: Students will discuss the concepts of Electric 2 (magnetic field and magnetic field sources), they are informed about how to explain these concepts to their students. Week 10: Students discuss the concepts of Electricity 2 (Faraday's law), they are informed about how to explain these concepts to their students. Week 11: Students will discuss the concepts of Electricity 2 (Self-induction), they are informed about how to explain these concepts to their students.

	Week 12: The students discuss the concepts of Electricity 2 (Alternating current circuits), they are informed about how to explain these concepts to their students. Week 13: The students discuss the concepts of Electricity 2 (Electromagnetic waves) and are informed about how they can explain these concepts to their students. Week 14: General evaluation.
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Reading Activities:20 Internet browsing, library work:20 Preparing a Presentation:16 Presentations:16 Preparation of Midterm and Midterm Exam:10 Final Exam and Preparation for Final Exam:28

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	40
Assignment	-	-
Application	-	-
Projects	-	-
Practice	-	-
Quiz	-	-
Percent of In-term Studies (%)		40
Percentage of Final Exam to Total Score (%)		60
Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	-	-	-
Reading Tasks	10	2	20
Studies	10	2	20
Material Design and Implementation			-
Report Preparing			
Preparing a Presentation	8	2	16
Presentations	8	2	16
Midterm Exam and Preperation for Midterm Exam	5	2	10
Final Exam and Preperation for Final Exam	7	4	28
Other (should be emphasized)			
Total Workload			152
Total Workload / 25			6.08
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research related to physics education.					X
2	Grasping the inter-disciplinary interaction related to physics education.				X	
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education.				X	
4	Interpreting and forming new types of knowledge by combining the knowledge from the physics education and the knowledge from various other disciplines.			X		
5	Solves the issues of physics education by using scientific methods.			X		
6	The ability to carry out a specialist study related to physics education independently.					
7	Developing new strategic approaches to solve the unforeseen and complex problems related to physics education arising in the practical processes.					X
8	Coming up with solutions while taking responsibility dealing					X

	with unforeseen and complex problems related to physics education.						
9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education.			X			
10	Evaluates issues related to physics education with a critical eye and encourages learning.				X		
11	Transferring the current developments in physics education and his/her own work within the national and international environments orally, visually and in written forms.				X		
12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary			X			
13	Having proficiency in a foreign language and establishing written and oral communication with that language						
14	Uses computer programs competent enough for related to physics education.						
15	Using communication technologies efficiently and according to the needs of the physics education.		X				
16	Collects data related to physics education, reviews and makes conclusions; implements and shares them by considering ethical values.					X	
17	Develops different perspectives related to physics education, plans them and assesses them within the quality framework.				X		
18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies.			X			

The Course's Lecturer(s) and Contact Information	Name, Surname: Prof. Dr. Mustafa KARADAĞ e-mail: mkaradag@gazi.edu.tr

<table>
<tr><th colspan="2">Course Description Form</th></tr>
<tr><td>Course Code and Name</td><td>Teaching Physics in Gifted</td></tr>
<tr><td>Course Semester</td><td>2</td></tr>
<tr><td>Catalog Content</td><td>Definition of gifted students, models used in gifted education, teaching physics in gifted students.</td></tr>
<tr><td>Textbook</td><td>Articles and theses in the literature on gifted people.</td></tr>
<tr><td>Supplementary Textbooks</td><td>-</td></tr>
<tr><td>Credit</td><td>6</td></tr>
<tr><td>Prerequisites of the Course
(Attendance Requirements)</td><td>There is no prerequisite or co-requisite for this course.</td></tr>
<tr><td>Type of the Course</td><td>Elective</td></tr>
<tr><td>Instruction Language</td><td>Turkish</td></tr>
<tr><td>Course Objectives</td><td>To have knowledge about teaching physics in gifted students and to examine studies in this field.</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Know the characteristics of gifted students ,
2. Study academic studies related with gifted students ,
3. Know education of gifted students in Turkey and the world ,
4. Know how to teach physics to gifted students.</td></tr>
<tr><td>Instruction Methods</td><td>Face to face</td></tr>
<tr><td>Weekly Schedule</td><td>Week 1: Who are gifted students?
Week 2: Who are gifted students?
Week 3: Models used at gifted students education ,
Week 4: Models used at gifted students education ,
Week 5: Models used at gifted students education
Week 6: Models used at gifted students education ,
Week 7: Gifted students educations at Turkey,
Week 8: Gifted students educations at Turkey,
Week 9: Gifted students educations at Turkey,
Week 10: Physic education at gifted students,
Week 11: Physic education at gifted students,
Week 12: Discussion related literature,
Week 13: Discussion related literature,
Week 14: Discussion related literature.</td></tr>
<tr><td>Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)</td><td>Weekly theoretical course hours: 3
Weekly applied course hours
Reading Activities: 30
Internet browsing, library work:30
Designing and implementing materials
Report preparing: 14
Preparing a Presentation: 12
Presentations: 3
Preparation of Midterm and Midterm Exam: 10
Final Exam and Preparation for Final Exam: 10</td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th></th><th>Numbers</th><th>Total Weighting (%)</th></tr>
<tr><td>Midterm Exams</td><td>1</td><td>40</td></tr>
<tr><td>Assignment</td><td></td><td></td></tr>
<tr><td>Application</td><td></td><td></td></tr>
<tr><td>Projects</td><td></td><td></td></tr>
<tr><td>Practice</td><td></td><td></td></tr>
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Quiz			
Percent of In-term Studies (%)		40	
Percentage of Final Exam to Total Score (%)	1	60	
Attendance			

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			0
Reading Tasks	10	3	30
Studies	10	3	30
Material Design and Implementation			0
Report Preparing	7	2	14
Preparing a Presentation	2	6	12
Presentations	1	3	3
Midterm Exam and Preparation for Midterm Exam	2	5	10
Final Exam and Preparation for Final Exam	2	5	10
Other (should be emphasized)			
Total Workload			151
Total Workload / 25			6,04
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Course develops student's skills of expression and research	X				
2	Grasping the inter-disciplinary interaction related to physics education					X
3	The ability to use the expert-level theoretical and practical knowledge acquired in physics education			X		
4	Interpreting and forming new types of knowledge by combining the					X

		knowledge from the physics education and the knowledge from various other disciplines						
	5	Solves the issues of physics education by using scientific methods					X	
	6	The ability to carry out a specialist study related to physics education independently			X			
	7	Developing new strategic approaches to solve the unforeseen and complex problems arising in the practical processes			X			
	8	Coming up with solutions while taking responsibility				X		
	9	Fulfilling the leader role in the environments where solutions are sought for the problems related to physics education				X		
	10	Evaluates issues with a critical eye and encourages learning					X	
	11	Transferring the current developments in the physics					X	

		education and his/her own work within the national and international environments orally, visually and in written forms						
	12	Ability to see and develop social relationships and the norms directing these relationships with a critical look and the ability to take action to change these when necessary					X	
	13	Having proficiency in a foreign language and establishing written and oral communication with that language	X					
	14	Uses computer programs competent enough for physics education			X			
	15	Using communication technologies efficiently and according to the needs of the physics education					X	
	16	Collects data related to the physics education, reviews and makes conclusions; implements and shares them by					X	

		considering ethical values						
	17	Develops different perspectives related to the physics education, plans them and assesses them within the quality framework				X		
	18	Internalizes the knowledge gained in the physics education, transforms it into a skill and uses it with interdisciplinary studies			X			
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