

**GAZI UNIVERSITY**  
**GAZI FACULTY OF EDUCATION**  
**DEPARTMENT OF MATHEMATICS AND SCIENCE EDUCATION**  
**DIVISION OF SCIENCE EDUCATION**  
**BACHELOR'S DEGREE COURSE CONTENTS**

**COURSES**

**I. SEMESTER**

N.	C. Code	Area	Course Name	T	A	L	ECTS
1	EB-101	MB	Introduction to Education	2	0	2	3
2	TAR-103	GK	History of Turkish Revolution and Atatürk's Principles-I	2	0	2	2
3	TD-103	GK	Turkish Language-I	2	0	2	2
4	YAD-103	GK	Foreign language-I (English)	2	0	2	2
5	BİL-101	GK	Information Technologies	2	0	2	2
6	FEBÖ-101	GK	Earth Science	2	0	2	3
7	FEBÖ-103	GK	General Mathematics-I	2	0	2	3
8	FEBÖ-105	AE	Physics-I	2	2	3	5
9	FEBÖ-107	AE	Chemistry-I	2	2	3	5
10	FEBÖ-109	AE	Laboratory Safety	2	0	2	3
<b>Total</b>				<b>20</b>	<b>4</b>	<b>22</b>	<b>30</b>

**II. SEMESTER**

N.	C. Code	Area	Course Name	T	A	L	ECTS
1	EB-102	MB	Instruction Technologies	2	0	2	3
2	EB-103	MB	Research Methods in Education	2	0	2	3
3	TAR-104	GK	History of Turkish Revolution and Atatürk's Principles-II	2	0	2	2
4	TD-104	GK	Turkish Language- II	2	0	2	2
5	YAD-104	GK	Foreign Language-II (English)	2	0	2	2
6	FEBÖ-102	GK	General Mathematics-II	2	0	2	3
7	FEBÖ-104	AE	Physics-II	2	2	3	5
8	FEBÖ-106	AE	Chemistry-II	2	2	3	5
9	FEBÖ-108	AE	Biology-I	2	2	3	5
<b>Total</b>				<b>18</b>	<b>6</b>	<b>21</b>	<b>30</b>

### III. SEMESTER

N.	C. Code	Area	Course Name	T	A	L	ECTS
1	EB-104	MB	Program Development and Instruction	2	0	2	3
3	EBS-...	MB	Elective-I	2	0	2	3
4	FEBÖ-201	GK	Intelligence Games	2	0	2	2
5	FEBÖ-203	AE	Physics-III	2	2	3	4
6	FEBÖ-205	AE	Chemistry-III	2	2	3	4
7	FEBÖ-207	AE	Biology-II	2	2	3	4
8	FEBÖ-209	AE	A. Elective-I (Physics In Daily Life)	2	0	2	4
	FEBÖ-211	AE	A. Elective I (Animations and Simulations in Physics Subjects)	2	0	2	4
9	FEBÖ-213	AE	A. Elective II.(Biological Richness of Turkey)	2	0	2	3
	FEBÖ-215	AE	A. Elective II. (Nutrition and Nutrient Science)	2	0	2	3
10	FEBÖ-217	AE	A. Elective III. (Chemistry and Technology)	2	0	2	3
	FEBÖ-219	AE	A. Elective III. ( Environmental Chemistry)	2	0	2	3
<b>Total</b>				<b>18</b>	<b>6</b>	<b>21</b>	<b>30</b>

### IV. SEMESTER

N.	C. Code	Area	Course Name	T	A	L	ECTS
1	EB-106	MB	Instructional principles and Methods	2	0	2	3
2	EB-105	MB	Educational Psychology	3	0	3	3
3	EBS-...	MB	Elective-II	2	0	2	3
4	GKS-...	GK	Elective-I	2	0	2	2
5	FEBÖ-202	GK	Astronomy	2	0	2	4
6	FEBÖ-204	AE	Physics-IV	2	2	3	4
7	FEBÖ-206	AE	Chemistry-IV	2	0	2	4
8	FEBÖ-208	AE	Biology-III	2	2	3	4
9	FEBÖ-212	AE	Science Education Program	2	0	2	3
<b>Total</b>				<b>19</b>	<b>4</b>	<b>21</b>	<b>30</b>

### V. SEMESTER

N.	C. Code	Area	Course Name	T	A	L	ECTS
1	EB-107	MB	Measurement and Evaluation in Education	2	0	2	3
2	FEBÖ-301	MB	Science Teaching-I	3	0	3	5
3	EBS-...	MB	Elective-II	2	0	2	3
4	FEBÖ-303	GK	Community Service	1	2	2	3
5	GKS-...	GK	Elective-II	2	0	2	2
6	FEBÖ-305	AE	Biology-IV	2	0	2	3
7	FEBÖ-307	AE	Science Teaching Laboratory Applications-I	2	2	3	4

8	FEBÖ-309	AE	Science Teaching Laboratory Applications-I	3	0	3	3
9	FEBÖ-311	AE	A. Elective-IV (Educational Robotics in Science Teaching)	2	2	3	4
	FEBÖ-313	AE	A. Elective-IV (Technological Project Design in Science Teaching)	2	2	3	4
<b>Total</b>				<b>19</b>	<b>6</b>	<b>22</b>	<b>30</b>

#### VI. SEMESTER

N.	C. Code	Area	Course Name	T	A	L	ECTS
1	EB-108	MB	Classroom Management	2	0	2	3
2	EBS-...	MB	Elective-IV	2	0	2	3
3	FEBÖ-302	MB	Science Teaching - II	2	2	3	5
4	FEBÖ-304	GK	Technology Integration in Science Teaching	2	0	2	3
5	FEBÖ-306	GK	Environmental Science	2	0	2	3
6	GKS-...	GK	Elective-III	2	0	2	2
7	FEBÖ-308	AE	Teaching Nature of Science	2	0	2	3
8	FEBÖ-310	AE	Science Teaching Laboratory Applications -II	2	2	3	5
9	FEBÖ-312	AE	Elective-V (Scientific Reasoning)	2	0	2	3
	FEBÖ-314	AE	Elective-V (Applications of Science in Technology)	2	0	2	3
<b>Total</b>				<b>18</b>	<b>4</b>	<b>20</b>	<b>30</b>

#### VII. SEMESTER

N.	C. Code	Area	Course Name	T	A	L	ECTS
1	FEBÖ-401	MB	Teaching Practice-I	2	6	5	8
2	EB-109	MB	Special Education and Inclusion	2	0	2	3
3	EB-110	MB	Turkish Educational System and School Management	2	0	2	3
4	FEBÖ-403	MB	Measurement and Evaluation in Science Teaching	2	0	2	4
5	FEBÖ-405	MB	Misconceptions in Science Education	2	0	2	3
	FEBÖ-407	AE	Elective-VI (Field Study In Biology)	2	0	2	3
	FEBÖ-409	AE	Elective-VI (Human Anatomy and Physiology)	2	0	2	3
	FEBÖ-411	AE	Elective-VI (Chemistry in everyday life)	2	0	2	3
	FEBÖ-413	AE	Elective-VI (Chemical Wastes and Control)	2	0	2	3
	FEBÖ-415	AE	Elective-VI (Robotic Applications in Physics Topics)	2	0	2	3
6	FEBÖ-417	AE	Elective-VII (Socioscientific Issues in Science Teaching)	2	0	2	3
	FEBÖ-419	AE	Elective-VII (Science and Technology Related Problems)	2	0	2	3

7	FEBÖ-421	AE	Elective-VIII (Microteaching Sessions in Science Teaching)	2	0	2	3
	FEBÖ-423	AE	Elective-VIII (Designing and Implementing Science Instruction)	2	0	2	3
<b>Total</b>				<b>16</b>	<b>6</b>	<b>19</b>	<b>30</b>

#### VIII. SEMESTER

N.	C. Code	Area	Course Name	T	A	L	ECTS
1	FEBÖ-402	MB	Teaching Practice-II	2	6	5	8
2	EB-111	MB	Guidance in Schools	2	0	2	3
3	FEBÖ-404	MB	Interdisciplinary Science Teaching	2	0	2	3
4	GKS-...	GK	Elective-IV	2	0	2	2
5	FEBÖ-406	AE	Elective-IX (Special Topics in Chemistry)	2	0	2	4
	FEBÖ-408	AE	Elective-IX (Special Topics in Physics)	2	0	2	4
	FEBÖ-410	AE	Elective-IX (Special Topics In Biology)	2	0	2	4
6	FEBÖ-412	AE	Elective-X (21st Century Skills in Science Teaching)	2	0	2	4
	FEBÖ-414	AE	Elective-X (Environmental Education)	2	0	2	4
7	FEBÖ-416	AE	Elective-XI (Project Development in Science Education)	2	0	2	3
	FEBÖ-418	AE	Elective-XI (Popular Science Activities)	2	0	2	3
8	FEBÖ-420	AE	Elective-XII (Out-of-School Learning Environments in Science Teaching)	2	0	2	3
	FEBÖ-422	AE	Elective-XII (Science Textbook Analysis)	2	0	2	3
<b>Total</b>				<b>16</b>	<b>6</b>	<b>19</b>	<b>30</b>

### 1. Year

#### I. Semester

**Course Code:** EB-101

**Course Name:** Introduction to Education

**T: 2 A: 0 L: 2 ECTS: 3**

**Course Content:** Basic concepts related to education and training; aims and functions of education; the relationship between education and other fields and sciences; legal, social, cultural, historical, political, economic, philosophical and psychological foundations of education; method in educational sciences; school and classroom as an educational and learning environment; current developments in teaching and teacher training; educational orientations in the twenty-first century

**Course Code:** TAR-103

**Course Name:** History of Turkish Revolution and Atatürk's Principles-I

**T: 2 A: 0 L: 2 ECTS: 2**

**Course Content:** Basic Concepts of History of Revolution, World and Ottoman Empire at the Beginning of the 20th Century, The Last Period of the Ottoman State, The First World War, The Preparatory Period of the National Struggle

**Course Code:** TD-103

**Course Name:** Turkish Language-I

**T:2 A:0 L:2 ECTS:2**

**Course Content:** Have information about the different dimensions of academic writing and write high quality academic papers.

**Course Code:** YAD-103

**Course Name:** Foreign language-I (English)

**T:2 A:0 L: 2 ECTS:2**

**Course Content:** The course of YAD103 comprises of teaching the reading, writing, listening and speaking skills with English grammar and vocabulary at starter level.

**Course Code:** BİL-101

**Course Name:** Information Technologies

**T:2 A:0 L:2 ECTS:2**

**Course Content:** The fundamental components of the computer system, information technologies and computational thinking; problem solving concepts and approaches; algorithm and flow charts; computer systems; fundamental concepts related to software and hardware; fundamentals of operating systems; current operating systems; word processing programs; spreadsheets/table/graphics programs; presentation programs; desktop publishing; database management systems; internet use in education; communication and business alliance technologies; safe internet use; information ethics and copyrights; the effects of computer and internet on children/teenagers.

**Course Code:** FEBÖ-101

**Course Name:** Earth Science

**T:2 A:0 L:2 ECTS: 3**

**Course Content:** Basic concepts of earth science

**Course Code:** FEBÖ-103

**Course Name:** General Mathematics-I

**T:2 A:0 L: 2 ECTS:3**

**Course Content:** Numbers; relations; solutions of first and second degree equations; function definition and properties; trigonometric, exponential and logarithmic functions; limit, limit in functions, uncertainty situations in limit, continuity properties and types.

**Course Code:** FEBÖ-105

**Course Name:** Physics-I

**T:2 A:2 L:3 ECTS:5**

**Course Content:** The science of physics, vectors; basic quantities of motion, motion and types in one and two dimensions; force and torque, static (equilibrium) and dynamics (Newton's laws of motion), universal gravity; work, power, energy; simple machines; pressure, buoyancy; impulse and momentum. Kinematics and dynamics of rotation motion, simple harmonic motion.

**Course Code:** FEBÖ-107

**Course Name:** Chemistry-I

**T:2 A:2 L:3 ECTS:5**

**Course Content:** Historical development of chemistry; chemical reactions and stoichiometry; atom and models of atom; periodic system; metals; chemical compounds; thermochemistry; chemical bonds; attachment theories; intergranular interactions; states of matter: solids, liquids, gases; solutions; Open and closed-ended experiments on each subject.

**Course Code:** FEBÖ-109

**Course Name:** Laboratory Safety

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Rules to be followed in the laboratory; personal safety equipment; laboratory safety equipment; executive controls; glass materials and its safety; biological security; chemical safety; labeling and storage of chemical substances, fire and fire protection methods; Storage and disposal of chemical waste, collection, disposal and disposal of laboratory waste; first aid.

## **1. Year**

### **II. Semester**

**Course Code:** EB-102

**Course Name:** Instruction Technologies

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Learning, Teaching, Training, Curriculum Development and Educational technology Instructional technology, history. Cone of Experience. Communication and learning, Features of visual communication, Visual literacy. Teaching materials, factors affecting selection. Design principles and elements. Audio-visual materials. Digital content and presentations, Real experiences, simulations and models. TV learning, educational video tutorials on the Internet, Educational and Social networking sites, Interactive assessment tools. Distance learning

**Course Code:** EB-103

**Course Name:** Research Methods in Education

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Basic concepts and principles of research methods. Research process (recognizing the problem, identifying the problem and sample, collecting and analyzing data, interpreting the results).General characteristics of data collection tools. Data analysis and evaluation. Access to articles, theses and databases. Research models and types. Basic paradigms in scientific research. Qualitative and quantitative research designs. Sampling, data collection, data analysis in qualitative research; validity and safety in qualitative research. Examination, evaluation and presentation of articles or thesis. Prepare research report in accordance with research principles and ethics.

**Course Code:** TAR-104

**Course Name:** History of Turkish Revolution and Atatürk's Principles-II

**T:2 A:0 L:2 ECTS:2**

**Course Content:** Beginning of the National Struggle, the War of Turkish Independence, the establishment of the Republic of Turkey, reforms, Ataturk's principles of Turkish foreign policy, the current historical events which up today from Ataturk's death

**Course Code:** TD-104

**Course Name:** Turkish Language- 11

**T:2 A:0 L:2 ECTS:2**

**Course Content:** Have information about the different dimensions of academic writing and write high quality academic papers.

**Course Code:** YAD-104

**Course Name:** Foreign Language-II (English)

**T:2 A:0 L:2 ECTS:2**

**Course Content:** The course of YAD104 comprises of teaching the reading, writing, listening and speaking skills with English grammar and vocabulary at starter level.

**Course Code:** FEBÖ-102

**Course Name:** General Mathematics-II

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Derivative definition and geometric applications; graph drawings, indefinite integral, separable integral with variables, partial integral, applications of indefinite integral; definite integral; definite integral applications.

**Course Code:** FEBÖ-104

**Course Name:** Physics-II

**T:2 A:2 L:3 ECTS:5**

**Course Content:** Basic concepts of static electricity, Coulomb and Gauss's laws, potential and potential energy in point charges; capacitors; electric current and its basic concepts, direct current circuits, Kirchhoff's laws; magnetic field and magnetic force, Ampere's law, Faraday's law of induction, Lenz's law, self-induction, magnetic field energy, alternating current generators, electric motors, transformers and open and closed-ended experiments on these subjects.

**Course Code:** FEBÖ-106

**Course Name:** Chemistry-II

**T:2 A:2 L:3 ECTS:5**

**Course Content:** Aqueous solution chemistry; chemical reactions in aqueous solutions; chemical kinetics; chemical balance; acids and bases and salts; chemical reactions and thermodynamics; electrochemistry; Open and closed-ended experiments on each subject.

**Course Code:** FEBÖ-108

**Course Name:** Biology-I

**T:2 A:2 L:3 ECTS:5**

**Course Content:** Description of biology; living and non-living structures; diversity and classification of living things (prokaryotes, eukaryotes, species concept and taxonomic categories; basic unit of life (cell, cell structure and function, membrane structure and function); cell division (mitosis, meiosis and uncontrolled cell division); tissues (plant tissues; meristematic tissue and permanent (or non-meristematic) tissue); plant organs and structures (vegetative organs and generative organs, reproduction, fertilization and development in cryptogams and phanerogams); animal diversity (general characteristics of invertebrate and vertebrates) and open and closed-ended experiments on these issues

**2. Year**

**III. Semester**



**Course Code:** EB-104

**Course Name:** Program Development and Instruction

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Basic concepts of curriculum development; program development theoretical foundations; program types; philosophical of the curriculum, social, historical, psychological and economic foundations; program development and characteristics of curriculum; program development steps; basic elements of the program (target, content, process, evaluation) and the relationships between items; of target classification and its relationship with the elements of the program; content editing approaches; identifying training needs; program development process and models; training program design approaches; program evaluation models; program literacy; in the development of teaching programs duties and responsibilities; Characteristics of MoNE curriculum; implementation of curriculum; programs in the world and in Turkey new approaches and trends in development.

**Course Code:** FEBÖ-201

**Course Name:** Intelligence Games

**T:2 A:0 L:2 ECTS:2**

**Course Content:** With this course, students are informed about intelligence games and teaching outcomes. Intelligence games, which are encountered in daily life, are given to students with reasoning skills.

**Course Code:** FEBÖ-203

**Course Name:** Physics-III

**T:2 A:2 L:3 ECTS:4**

**Course Content:** Heat and temperature, thermal properties of matter, thermodynamic laws; the nature, speed and sources of light; enlightenment, reflection and mirrors; refraction and lenses, optical tools; waves, basic concepts in wave motion, arc waves, water waves, sound waves, earthquake waves, light waves and open and closed-ended experiments on these subjects.

**Course Code:** FEBÖ-205

**Course Name:** Chemistry-III

**T:2 A:2 L:3 ECTS:4**

**Course Content:** Basic concepts of analytical chemistry; Precision and reliability of analytical data; Gravimetric analysis and evaluation of analysis results; Complex balance problems; Chemical balance in acid, base and salt solutions; Titrimetric analysis and evaluation of analysis results; Instrumental analysis methods.

**Course Code:** FEBÖ-207

**Course Name:** Biology-II

**T:2 A:2 L:3 ECTS:4**

**Course Content:** Introduction to metabolism, cell respiration and fermentation; photosynthesis; comparison of cell respiration and photosynthesis; animal structure and function; animal tissues, organs and systems, reproductive system, asexual and sexual reproduction in animals; nutrition and digestion in animals, feeding mechanisms in animals; Circulatory system in animals, comparison of animals with open and closed circulatory systems, examination of heart, vascular and blood structures; gas exchange, respiratory surfaces, respiratory organs and respiratory mechanisms in animals; excretory system, osmoregulation, comparison of excretory products and diversity in excretory systems in animals; nervous system in animals, types of nervous system, central and peripheral nervous system; sensory mechanisms, hearing and balance, sight, smell and taste, touch; endocrine system, hormones, feedback, functions of hormones; Support and movement systems in animals, external and internal skeleton, bone types, joints, muscle types and contraction mechanism and open and closed-ended experiments on these issues.

## **2. Year**

### **IV. Semester**

**Course Code:** EB-105

**Course Name:** Educational Psychology

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Basic principles and concepts of developmental psychology, preventive and risk factors in human development, basic development areas, theories of basic development areas, the implications of developmental psychology knowledge in terms of education, basic concepts in learning psychology, learning theories, the implications of learning psychology in terms of education.

**Course Code:** EB-106

**Course Name:** Instructional principles and Methods

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Key concepts related to instructional principles and methods; teaching-learning principles, models, strategies, methods and techniques; defining goals and objectives in teaching; selection and organization of the content in teaching and learning; instructional materials; educational planning and instructional plans; instructional theories and approaches; effective teaching in school, learning and success in learning; evaluation of in-class learning.

**Course Code:** FEBÖ-202

**Course Name:** Astronomy

**T:2 A:0 L:2 ECTS:4**

**Course Content:** Definition and sub-branches of astronomy; the history of astronomy and the transition to modern astronomy; basic concepts of astronomy; celestial coordinate system and sky positioning; astronomical units; the daily and annual movement of the world and its results; time, seasons and calendar; our satellite moon features, motions and earth-moon system; planets, their orbits, rotational and entanglement motions, properties and types; Kepler's and Newton's laws; other members of the solar system (comets, asteroids and meteorites, small objects beyond Neptune); stars, the structure of the sun-sun as a star, the formation and properties of stars, their distances, brightness, spectral classification of stars and the evolution of stars; constellations; classification, formation and evolution of galaxies; Hubble's law; universe and its formation theories; sky observation tools, space science and space studies and their effects on daily life.

**Course Code:** FEBÖ-204

**Course Name:** Physics-IV

**T:2 A:2 L:3 ECTS:4**

**Course Content:** Introduction to quantum physics, special relativity theory, black body radiation, photoelectric and Compton effect; wave-particle dichotomy De Broglie waves, Heisenberg uncertainty principle, Schrödinger wave, atomic models and modern atom theory.

**Course Code:** FEBÖ-206

**Course Name:** Chemistry-IV

**T:2 A:0 L:2 ECTS:4**

**Course Content:** Introduction to organic chemistry; Classification of organic compounds, naming organic compounds; Isomerism in organic compounds, reaction mechanisms in organic compounds.

**Course Code:** FEBÖ-208

**Course Name:** Biology-III

**T:2 A:2 L:3 ECTS:4**

**Course Content:** Definition, importance and historical development of the science of genetics; the birth of modern genetics, Mendel's laws, complete dominance, incomplete dominance, codominance, multiple alleles, deviations from Mendel's laws; cytoplasmic inheritance, mutations, molecular biology, gene technology, molecular genetics, human genetics and genetic diseases, population genetics, the opportunities that gene engineering provides to society, science and technology; history of evolutionary biology; evolutionary biology concepts; mechanisms of evolution: mutation, genetic drift, natural selection; macro evolution mechanisms: adaptation, speciation; history of life: family trees, fossil research; the first evolution of life in the world, the history of life, major evolutionary changes; Applications of evolutionary biology: genetics and medicine, and open-ended and closed-ended experiments on these issues.

**Course Code:** FEBÖ-212

**Course Name:** Science Education Program

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Basic concepts of curriculum, current science curriculum and content, preparing a lesson plan.

### **3. Year**

#### **V. Semester**

**Course Code:** EB-107

**Course Name:** Measurement and Evaluation in Education

**T:2 A:0 L:2 ECTS:3**

**Course Content:** The place and importance of measurement and evaluation in education;. Basic concepts of measurement and evaluation; Psychometric (validity, reliability, usefulness) properties of measurement instruments. Developing and implementing success tests; Interpretation of test results and giving feedback; Analysis of test and item scores; Evaluation and grading.

**Course Code:** FEBÖ-301

**Course Name:** Science Teaching-I

**T:3 A:0 L:3 ECTS:5**

**Course Content:** Objectives of science teaching, use of methods, strategies and materials

**Course Code:** FEBÖ-303

**Course Name:** Community Service

**T:1 A:2 L:2 ECTS:3**

**Course Content:** Society, community service practices and social responsibility concepts; social responsibility projects in terms of social and cultural values; identifying current societal problems; preparing projects for the solution of identified social problems; voluntarily taking part in social responsibility projects individually and as a group; participating in social responsibility projects in various institutions and organizations; participating in scientific events such as panels, conferences, congresses, symposiums as audience, speaker or organizer; Evaluating the results of social responsibility projects.

**Course Code:** FEBÖ-305

**Course Name:** Biology-IV

**T:2 A:0 L:2 ECTS:3**

**Course Content:** The meaning, application areas, importance and historical development of biotechnology; basic principles of biotechnology, microorganisms metabolism, plant-animal cell cultures, basic operations in biotechnology; biotechnological applications, microbial biomass

production (baker's yeast, single cell protein), production of primary metabolites (citric acid, fumaric acid, acetic acid, amino acid, vitamin), fermentations (alcohol fermentation, lactic acid production, butyric acid, butanol, acetone), secondary metabolite production (antibiotic), enzyme production, gene biotechnology, environmental biotechnology.

**Course Code:** FEBÖ-307

**Course Name:** Science Teaching Laboratory Applications-I

**T:2 A:2 L:3 ECTS:4**

**Course Content:** With this course, conducting various experiments within the scope of the 5th and 6th grade Science course curriculum, the importance of scientific process skills in experiments and the approaches to be used in the evaluation of student performance (knowledge, skill, attitude-value) are explained

**Course Code:** FEBÖ-309

**Course Name:** Science Teaching Laboratory Applications-I

**T:3 A:0 L:3 ECTS:3**

**Course Content:** Basic concepts of instructional technologies; the place, importance and use of teaching materials in the teaching process; planning and executing appropriate technologies to be used in the teaching process; selection of instructional materials, design and development principles of materials; design elements; course material development; misuse and consequences of materials in science teaching; developing two and three dimensional materials and using instructional technologies in material development; printed materials and textbook review; field-specific technological tools and materials; materials that can be used in distance education, introduction of classroom environments in which field-specific technology is integrated.

### **3. Year**

#### **VI. Semester**

**Course Code:** EB-108

**Course Name:** Classroom Management

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Classroom Management, discipline, time management

**Course Code:** FEBÖ-302

**Course Name:** Science Teaching - II

**T:2 A:2 L:3 ECTS:5**

**Course Content:** In this course, basic concepts about science teaching and teaching approaches, methods and techniques that can be used in science teaching are explained practically.

**Course Code:** FEBÖ-304

**Course Name:** Technology Integration in Science Teaching

**T:2 A:0 L:2 ECTS:3**

**Course Content:** In this course, technologies used in science teaching are introduced. The use of these technologies is explained. Students gains knowledge and skills about preparing a lesson plan by integrating technology into science teaching.

**Course Code:** FEBÖ-306

**Course Name:** Environmental Science

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Basic ecological concepts and principles, ecosystems, food chains, food web, habitat, competition; Relationships between populations in the community. (intraspecies and interspecies relationships), energy flow, circulation of matter, population growth, erosion, soil and water resources, environmental awareness, studies on environmental awareness in the world, institutions and organizations, environmental pollution, ecological footprint.

**Course Code:** FEBÖ-308

**Course Name:** Teaching Nature of Science

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Philosophy of science (meaning and field of interest, paradigms, philosophical trends and their impact on the development of science); content and teaching of the nature of knowledge.

**Course Code:** FEBÖ-310

**Course Name:** Science Teaching Laboratory Applications -II

**T:2 A:2 L:3 ECTS:5**

**Course Content:** With this course, conducting various experiments within the scope of the 7th and 8th grade Science course curriculum, determination of scientific process skills to be gained in experiments and the approaches to be used in the evaluation of student performance (knowledge, skill, attitude-value) are explained.

**4. Year**

**VII. Semester**

**Course Code:** FEBÖ-401

**Course Name:** Teaching Praticce-I

**T:2 A:6 L:5 ECTS:8**

**Course Content:** Observing teachers and students in the school environment, learning the organizational structure of the school, what tasks the administrators perform, examining the physical conditions of the school and its relations with the society, making observations on teaching methods and techniques specific to the field, taking active roles by participating in educational activities.

**Course Code:** EB-109

**Course Name:** Special Education and Inclusion

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Basic concepts of special education; principles and historical development of special education; legislation on special education; diagnosis and evaluation in special education; individualization of instruction; inclusion and support special education services; family participation in education and cooperation with the family; characteristics of different disability and ability groups; educational approaches and teaching strategies for different groups; effective strategies and behavior management in classroom management

**Course Code:** EB-110

**Course Name:** Turkish Educational System and School Management

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Structure of Turkish Education System, Trends, Problems.School management.School management and leadership.

**Course Code:** FEBÖ-403

**Course Name:** Measurement and Evaluation in Science Teaching

**T:2 A:0 L:2 ECTS:4**

**Course Content:** In this course, the selection, development, application, scoring of measurement and evaluation techniques-tools in science teaching and evaluation of measurement results are explained

**Course Code:**FEBÖ-405

**Course Name:** Misconceptions in Science Education

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Meaningful learning and constructivism in science teaching; learning concepts; definition of misconceptions; factors that cause misconceptions; theoretical approaches put forward until today about the nature of misconceptions and conceptual change; misconceptions widely observed

among students regarding the basic subjects of physics, chemistry, biology, environment and astronomy and the nature of science; assessment tools used to diagnose misconceptions (multi-tier diagnostic tests, interviews, concept maps, concept cartoons, etc.); development and application of teaching methods, techniques and materials that can be used to overcome misconceptions (refutational texts, conceptual change texts, predict-observe-explain, bridging analogies, etc.).

#### **4. Year**

#### **VIII. Semester**

**Course Code:** FEBÖ-402

**Course Name:** Teaching Practice-II

**T:2 A:6 L:5 ECTS:8**

**Course Content:** Making observations related to the field-specific teaching methods and techniques; conducting individual and group micro-teaching applications using specific teaching methods and techniques specific to the field; field-specific activity and material development; preparing instructional environments, managing the classroom, measuring, evaluating and reflecting.

**Course Code:** EB-111

**Course Name:** Guidance in Schools

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Basic concepts and principles of RPD, history, field and branches of RPD; used research and evaluation methods, psychological counseling process, psychological counseling theories, school counseling models (traditional and developmental), school counseling approaches (crisis-oriented, remedial-remedial, preventive and developmental), the purpose, principles of traditional school counseling model, traditional school counseling model the role and functions of the psychological counselor, the purpose, principles and program of the developmental school counseling model (Comprehensive Developmental Guidance Program), basic services / interventions, and the role and functions of the developmental school counselor; The aim and principles of developmental and preventive approach in RPD, the importance of life skills education in developmental approach, positive youth development approaches and prevention levels in prevention (basic, second and third level)

**Course Code:** FEBÖ-404

**Course Name:** Interdisciplinary Science Teaching

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Definition, Importance and Historical Development of STEM Approach, STEM Approach in the World and Turkey, The Place and Importance of STEM approach in MEB Science Program, 21st Century Skills and Their Reflections on Education, STEM-Based learning approaches and their importance and Classroom / Laboratory Applications of STEAM, STEM Approach, STEM



Lesson Plan Preparation and Evaluation, Preparing and Presenting Original Projects Based on STEM Approach.

## **ELECTIVE COURSES**

**Course Code:** EBS-???

**Course Name:** Elective-I

**T:2 A:0 L:2 ECTS:3**

**Course Content:** To be selected from elective course pool recommended by educational sciences.

**Course Code:** FEBÖ-209

**Course Name:** Elective-I (Physics In Daily Life)

**T:2 A:0 L:2 ECTS:4**

**Course Content:** The place and importance of physics in daily life are explained in the case of the basic fields of physics (force-motion, electricity-magnetism, energy and energy transformations, sound, light and thermodynamics).

**Course Code:** FEBÖ-211

**Course Name:** Elective I (Animations and Simulations in Physics Subjects)

**T:2 A:0 L:2 ECTS:4**

**Course Content:** Information is given to evaluate the suitability of animations and simulations prepared in the field of physics subject area. The students gain the ability to evaluate animation and simulations in the subject area of physics.

**Course Code:** FEBÖ-213

**Course Name:** Elective II.(Biological Richness of Turkey)

**T:2 A:0 L:2 ECTS:3**

**Course Content:** General information and concepts, flora, fauna, biomes, distribution of living things and endemism. The physical geography, geology and climate of Turkey. The causes of biological richness of Turkey. Flora of Turkey; Cryptogamae and Phanerogamae (gymnosperms, angiosperms). Fauna of Turkey; invertebrates and vertebrates (fish, amphibians, reptiles, birds, mammals). The plant genetic resources of Turkey, endemic plants, rich genera in terms of endemism. The animal genetic resources of Turkey. Conservation of genetic resources and diversity. Biodiversity education

**Course Code:** FEBÖ-215

**Course Name:** Elective II. (Nutrition and Nutrient Science)

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Definition and principles of nutrition and nutrition science, nutrients, carbohydrates, fats, proteins, vitamins, enzymes, water and minerals, digestion, absorption, metabolism, nutrition and health relationship, nutritional disorders, nutrition in special cases (infancy, childhood, pregnancy, old age, disease etc.) food additives, food safety

**Course Code:** FEBÖ-217

**Course Name:** Elective III. (Chemistry and Technology)

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Chemistry and Technology relationship; applications of chemistry in health field, applications of chemistry in food industry; food additives, ores; iron and steel production, sulfuric acid production; surfactants; purification of waters; cement, plaster, glass and ceramic production; electrolytic coating, chemical weapons, explosives; rocket fuels and fireworks; nuclear bombs; nuclear power plants; oil and fuel production; biodiesel and biogas.

**Course Code:** FEBÖ-219

**Course Name:** Elective III. Environmental Chemistry

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Environmental chemistry, green chemistry and chemical pollution; water pollutants (detergent, industrial waste, natural organic pollutants, oil and oil contamination, waste water treatment); soil pollutants (artificial fertilizers, heavy metals, radioactive waste); air pollutants (greenhouse gases, acid rain, CFCs, dusts and heavy metals, global warming), chemical pollution and other pollution sources; greenhouse gases and acid rain; projects aimed at preventing environmental pollution.

**Course Code:** EBS-???

**Course Name:** Elective-II

**T:2 A:0 L:2 ECTS:3**

**Course Content:** To be selected from elective course pool recommended by educational sciences.

**Course Code:** GKS-...

**Course Name:** Elective-I

**T:2 A:0 L:2 ECTS:2**

**Course Content:** It will be chosen from the common courses opened by the education coordinator.

**Course Code:** EBS-...

**Course Name:** Elective-III

**T:2 A:0 L:2 ECTS:3**

**Course Content:** To be selected from elective course pool recommended by educational sciences.

**Course Code:**GKS-...

**Course Name:** Elective-II

**T:2 A:0 L:2 ECTS:2**

**Course Content:** It will be chosen from the common courses opened by the education coordinator.

**Course Code:** FEBÖ-311

**Course Name:** Elective-IV (Educational Robotics in Science Teaching)

**T:2 A:2 L:3 ECTS:4**

**Course Content:** In this course, educational robotics tools that can be used in science teaching are introduced. Coding programs used in educational robotics tools are introduced. Project is designed to produce solutions for daily life problems using educational robotic tools.

**Course Code:**FEBÖ-313

**Course Name:** Elective-IV (Technological Project Design in Science Teaching)

**T:2 A:2 L:3 AKTS:4**

**Course Content:** In this course, the place and importance of technology in science teaching is introduced. By making students use various technologies, they gain the ability to design technological projects for daily life problems.

**Course Code:** EBS-...

**Course Name:** Elective-IV

**T:2 A:0 L:2 ECTS:3**

**Course Content:** To be selected from elective course pool recommended by educational sciences.

**Course Code:** GKS-...

**Course Name:** Elective-III

**T:2 A:0 L:2 ECTS:2**

**Course Content:** It will be chosen from the common courses opened by the education coordinator.

**Course Code:** FEBÖ-312

**Course Name:** Elective-V (Scientific Reasoning)

**T:2 A:0 L:2 ECTS:3**

**Course Content:** With this course, students are informed about scientific reasoning and teaching outcomes. The students gain reasoning skills regarding scientific reasoning issues encountered in daily life.

**Course Code:** FEBÖ-314

**Course Name:** Elective-V (Applications of Science in Technology)

**T:2 A:0 L:2 ECTS:3**

**Course Content:** With this course, the uses and benefits of physics, chemistry and biology disciplines in modern society are explained to students.

**Course Code:** FEBÖ-407

**Course Name:** Elective-VI (Field Study In Biology)

**T:2 A:0 L:2 ECTS:3**

**Course Content:** With this course, students will learn to examine scientific studies, projects, theses, articles and books in biology study areas (zoology, botany, ecology, genetics, biotechnology, entomology, hydrobiology and aquatic pollution, water quality, environmental pollution, etc.).

**Course Code:** FEBÖ-409

**Course Name:** Elective-VI (Human Anatomy and Physiology)

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Introduction to anatomy and structural order, Anatomical regions and spaces, Tissues, Skeletal system and joints, Anatomy and physiology of the muscular system, digestive system, respiratory system, circulatory system, urinary system, nervous system, sensory organs, endocrine system and reproductive system.

**Course Code:** FEBÖ-411

**Course Name:** Elective-VI (Chemistry in everyday life)

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Kitchen chemistry; cleaning agents and chemistry; stationery and chemistry; cosmetics and chemistry; healthcare supplies and chemistry; building materials and chemistry, agriculture and chemistry.

**Course Code:** FEBÖ-413

**Course Name:** Elective-VI (Chemical Wastes and Control)

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Sources of chemical wastes; ways of exposure to chemicals, environmental contamination with chemicals; toxic effects of chemicals, effects of chemicals on living things, effects of chemicals on the environment; radioactivity, radioactive half-life and radioactive contamination.

**Course Code:** FEBÖ-415

**Course Name:** Elective-VI (Robotic Applications in Physics Topics)

**T:2 A:0 L:2 ECTS:3**

**Course Content:** Introduction to coding, introduction of Arduino board, installation and introduction of Tinkercad, Arduino and Mblock Programs. Introduction of Tinkercard circuit elements, analog and digital data. Coding applications in electrical issues.

**Course Code:** FEBÖ-417

**Course Name:** Elective-VII (Socioscientific Issues in Science Teaching)

**T: 2 A:0 L:2 ECTS:3**

**Course Content:** With this course, students are informed about the teaching of socioscientific issues and the teaching outcomes of socioscientific issues. The students gain reasoning skills for socioscientific issues encountered in daily life.

**Course Code:** FEBÖ-419

**Course Name:** Elective-VII (Science and Technology Related Problems)

**T: 2 A:0 L:2 ECTS: 3**

**Course Content:** With this course, basic concepts related to science and technology problems are explained.

**Course Code:** FEBÖ-421

**Course Name:** Elective-VIII (Microteaching Sessions in Science Teaching)

**T: 2 A:0 L: 2 ECTS: 3**

**Course Content:** Examining the general competencies of the teaching profession (professional knowledge, skills, attitudes and values); the scope of micro teaching, the benefits and limitations of micro teaching; preparing a lesson plan in accordance with the science curriculum; conducting lesson in accordance with the lesson plan; discussion of teaching conducted using techniques such as self-assessment and peer assessment, as well as deep and critical thinking skills; developing and re-conducting the lesson; Analysis of weaknesses, strengths, threats and opportunities in science teaching (SWOT analysis) by using teaching experiences; creating an individual roadmap for science teaching using the feedback obtained

**Course Code:** FEBÖ-423

**Course Name:** Elective-VIII (Designing and Implementing Science Instruction)

**T:2 A:0 L:2 ECTS:3**

**Course Content:** This course gives information about instructional design models. The process of designing, developing, applying and evaluating science teaching based on instructional design models is explained.

**Course Code:** GKS-...

**Course Name:** Elective-IV

**T:2 A:0 L:2 ECTS:2**

**Course Content:** It will be chosen from the common courses opened by the education coordinator.

**Course Code:** FEBÖ-406

**Course Name:** Elective-IX (Special Topics in Chemistry)

**T:2 A:0 L:2 ECTS:4**

**Course Content:** Air pollution, chemical perspective to our health and food, enthalpy sources of our world, from river water to drinking water; glasses and ceramics; relationship between visual arts and chemistry; photo chemistry; corrosion chemistry, biological processes and equilibrium, drug therapy and chemistry, chemical cleaning materials; Students conduct research on themes such as carbon-based materials, chemistry in the life process, chemical pollution, nuclear energy, and present their research results by reporting.

**Course Code:** FEBÖ-408

**Course Name:** Elective-IX (Special Topics in Physics)

**T: 2 A: 0 L: 2 ECTS: 4**

**Course Content:** Know the various uses and benefits of physics in modern society

**Course Code:** FEBÖ-410

**Course Name:** Elective-IX (Special Topics In Biology)

**T:2 A:0 L:2 ECTS:4**

**Course Content:** With this course, students learn about genetically modified organisms, stem cell technology, organ transplants, the importance of biology for society, ready-made foods, chemicals, biological sensors, genetic replication, bioinformatics and develop creative solutions and suggestions.

**Course Code:** FEBÖ-412

**Course Name:** Elective-X (21st Century Skills in Science Teaching)

**T:2 A:0 L:2 ECTS:4**

**Course Content:** This course gives information about 21st century skills. The place and importance of 21st century skills in science curriculum is explained. Teaching strategy, methods and techniques to improve 21st century skills are explained.

**Course Code:** FEBÖ-414

**Course Name:** Elective-X (Environmental Education)

**T:2 A:0 L:2 ECTS:4**

**Course Content:** With this course, students comparatively learn how environmental education should be in the world and in our country, participate in applied environmental activities and develop creative solutions to environmental problems they encounter in daily life.

**Course Code:** FEBÖ-416

**Course Name:** Elective-XI (Project Development in Science Education)

**T: 2 A: 0 L:2 ECTS: 3**

**Course Content:** Recognizing various types of projects that can be carried out in the field of science teaching, developing knowledge and skills related to project idea development, project preparation, execution and termination

**Course Code:** FEBÖ-418

**Course Name:** Elective-XI (Popular Science Activities)

**T: 2 A: 0 L:2 ECTS: 3**

**Course Content:** The development of knowledge and skills related to popular science activities

**Course Code:** FEBÖ-420

**Course Name:** Elective-XII (Out-of-School Learning Environments in Science Teaching)

**T: 2 A: 0 L:2 ECTS: 3**

**Course Content:** With this course, the scope of out-of-school learning, science teaching in out-of-school settings, teaching methods and techniques suitable for out-of-school learning environments are explained.

**Course Code:** FEBÖ-422

**Course Name:** Elective-XII (Science Textbook Analysis)

**T: 2 A: 0 L:2 ECTS: 3**

**Course Content:** A critical analysis of science textbooks and curriculums approved by the Ministry of National Education. Analysing the books in terms of content, language, suitability to student level, format, attractiveness, contribution to meaningful learning and ease of use in teaching

