# MISCONCEPTS IN SCIENCE EDUCATION

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| 1 | Course Title: | MISCONCEPTS IN SCIENCE EDUCATION |
| 2 | Course Code: | FEN0003 |
| 3 | Type of Course: | Optional |
| 4 | Level of Course: | First Cycle |
| 5 | Year of Study: | 2 |
| 6 | Semester: | 3 |
| 7 | ECTS Credits Allocated: | 4.00 |
| 8 | Theoretical (hour/week): | 2.00 |
| 9 | Practice (hour/week): | 0.00 |
| 10 | Laboratory (hour/week): | 0 |
| 11 | Prerequisites: | |
| 12 | Language: | Turkish |
| 13 | Mode of Delivery: | Face to face |
| 14 | Course Coordinator: | Doç. Dr. NERMİN BULUNUZ |
| 15 | Course Lecturers: | |
| 16 | Contact information of the Course Coordinator: | Doç. Dr. Nermin Bulunuz.<br>Eğitim Fakültesi, E Blok, No:237. Görükle Bura.<br>Dahili Tel. 42238 |
| 17 | Website: | |
| 18 | Objective of the Course: | The objectives of this lesson are:<br>1. What is misconception to prospective teachers who will be science teachers;<br>2. What are the negative effects on students' cognitive development;<br>3. What are the most common misconceptions of students in Science classes;<br>4. What are the conceptual change methods that can be used in the classroom to eliminate these errors;<br>5. How conceptual change methods can be used by Science teachers in lessons;<br>6. To teach a science teacher what methods he can use to detect misconceptions in his students and<br>7. To give examples of domestic and foreign research on this subject. |
| 19 | Contribution of the Course to Professional Development: | |
| 20 | Learning Outcomes: | |

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| | 1 | Learning the basic concept information. |
| | 2 | Understanding how do we learn concepts. |
| | 3 | To be able to learn the concept of change theory (CCT) and the 4 conditions of organizing knowledge in our minds according to CCT. |
| | 4 | What is the misconception? What are the reasons? |
| | 5 | What are the negative effects of misconceptions on students? |
| | 6 | What are the techniques to identify common misconceptions in students? |
| | 7 | To learn learning and teaching approaches that can be used in teaching concepts and overcoming misconceptions. |

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| | **8** | 69/5000<br>To be able to comprehend learning stations from conceptual change methods. |
| | **9** | 42/5000<br>Concept maps,<br>Concept cartoons, |
| | **10** | To be able to examine the recent researches and articles written in our country in the field of misconceptions in science teaching. |

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| **21** | Course Content: | |
| | **Course Content:** | |
| Week | Theoretical | Practice |
| **1** | First Meeting.<br>Introducing the course and giving information about the course content. | |
| **2** | What is concept?<br>How do we learn concepts?<br>(Piaget, Vygotsky, & Kuhn)<br>Conceptual change thoery. | |
| **3** | What is misconception?<br>What are the reasons of misconceptions?<br>What are the negative effects of misconceptions on students? | |
| **4** | Examination of the most common misconception examples at different grade levels in the Science program by giving examples from the researches in this field. | |
| **5** | Methods of detecting misconceptions:<br>• Prediction-Observation-Description (TGA, TAGA),<br>What I know, What I want to learn, What I learned | |
| **6** | Methods of detecting misconceptions:<br>• Formative probe questions,<br>• Examining examples of formative assessment probes prepared at different grade levels. | |
| **7** | Misconceptions Methods to overcome misconceptions:<br>Learning stations | |
| **8** | Misconceptions Methods to overcome misconceptions:<br>Learning stations<br>Examination of article samples written about learning stations.<br>• Concept maps,<br>-What is it used for?<br>-How to draw?<br>How is it evaluated? | |
| **9** | Methods for clearing misconceptions:<br>Concept cartoons, | |
| **10** | Methods for clearing misconceptions:<br>• Conceptual change texts (KDM), one of the methods to overcome misconceptions.<br>• Examining (KDM) examples and reminding how they are used in the KDM classroom environment. | |
| **11** | 88/5000<br>Methods for clearing misconceptions:<br>Analogies,<br>Semantic Analysis Tables (ACT) | |

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| **12** | 62/5000<br>Methods for clearing misconceptions: Concept Networks (KA) | |
| **13** | 113/5000<br>Examination of research examples in which methods of eliminating misconceptions are used through articles. | |
| **14** | General evaluation of the semester & Getting students' feedback about the course. | |

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| **22** | Textbooks, References and/or Other Materials: | 1. Bulunuz, N. (2006). Understanding of Earth and Space Science Concepts: Strategies for Concept Building in Elementary Teacher Preperation. Doktora Tezi, Georgia State Universitesi, Atlanta,USA.<br>2. Gödek, Y., Polat, D., & Kaya, V.H. (2018). Fen Bilgisi öğretiminde Kavram Yanılgıları: Kavram yanılgılarının tespiti-Giderilmesi ve Uygulamalı örnekler. Pegem Akademi, Ankara.<br>3. Ülgen, G. (2004). Kavram Geliştirme, Kuramlar ve Uygulamalar, Nobel Yayıncılık, Ankara.<br>4. Kuhn ,T. (1970). Bilimsel Devrimlerin Yapısı. |
| **23** | Assesment | |

| **TERM LEARNING ACTIVITIES** | **NUMBER** | **WEIGHT** |
|---|---|---|
| Midterm Exam | 1 | 30.00 |
| Quiz | 0 | 0.00 |
| Home work-project | 1 | 10.00 |
| Final Exam | 1 | 60.00 |
| Total | 3 | 100.00 |
| Contribution of Term (Year) Learning Activities to Success Grade | | 40.00 |
| Contribution of Final Exam to Success Grade | | 60.00 |
| Total | | 100.00 |
| Measurement and Evaluation Techniques Used in the Course | | |

**24** **ECTS / WORK LOAD TABLE**

| Activites | Number | Duration (hour) | Total Work Load (hour) |
|---|---|---|---|
| Theoretical | 14 | 2.00 | 28.00 |
| Practicals/Labs | 0 | 0.00 | 0.00 |
| Self study and preperation | 5 | 10.00 | 50.00 |
| Homeworks | 1 | 10.00 | 10.00 |
| Projects | 0 | 0.00 | 0.00 |
| Field Studies | 0 | 0.00 | 0.00 |
| Midterm exams | 1 | 10.00 | 10.00 |
| Others | 0 | 0.00 | 0.00 |
| Final Exams | 1 | 15.00 | 15.00 |
| Total Work Load | | | 113.00 |
| Total work load/ 30 hr | | | 3.77 |
| ECTS Credit of the Course | | | 4.00 |

| 25 | CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS | | | | | | | | | | | | | | | |
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| | PQ1 | PQ2 | PQ3 | PQ4 | PQ5 | PQ6 | PQ7 | PQ8 | PQ9 | PQ10 | PQ11 | PQ12 | PQ13 | PQ14 | PQ15 | PQ16 |
| ÖK1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LO: Learning Objectives PQ: Program Qualifications | | | | | | | | | | | | | | | | |
| Contribution Level: | 1 very low | | 2 low | | 3 Medium | | 4 High | | 5 Very High | | | | | | | |