**FIELD CROPS PhD PROGRAMME**

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| **First Year** | | | | | | |
| **I. Semester** | | | | | | |
| Code | Course Title | ECTS | T+P | Credit | C/E | Language |
| 501011101 | [THE SCIENTIFIC RESEARCH METHODS AND ITS ETHICS](#EN39) | 7.5 | 3+0 | 3 | **C** | Turkish |
| 504212607 | [SCIENTIFIC PROJECT AND ARTICLE PREPARATION TECHNIQUE](#EN36) | 7.5 | 3+0 | 3 | **C** | Turkish |
|  | Elective Course-1 | 7.5 | 3+0 | 3 | E | Turkish |
|  | Elective Course-2 | 7.5 | 3+0 | 3 | E | Turkish |
|  | Total of I. Semester | 30 |  | 12 |  |  |
| **II. Semester** | | | | | | |
| Code | Course Title | ECTS | T+P | Credit | C/E | Language |
|  | Elective Course-3 | 7.5 | 3+0 | 3 | E | Turkish |
|  | Elective Course-4 | 7.5 | 3+0 | 3 | E | Turkish |
|  | Elective Course-5 | 7.5 | 3+0 | 3 | E | Turkish |
| 504212001 | PhD Seminar | 7.5 | 0+1 | - | **C** | Turkish |
|  | Total of II. Semester | 30 |  | 9 |  |  |
|  | TOTAL OF FIRST YEAR | 60 |  | 21 |  |  |

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| **Second Year** | | | | | | |
| **III. Semester** | | | | | | |
| Code | Course Title | ECTS | T+P | Credit | C/E | Language |
| 504211801 | PhD PROFICIENCY | 30 | 0+1 | - | **C** | Turkish |
|  | Total of III. Semester | 30 |  |  |  |  |
| **IV. Semester** | | | | | | |
| Code | Course Title | ECTS | T+P | Credit | C/E | Language |
| 501011102 | THESIS PROPOSAL | 30 | 0+1 | - | **C** | Turkish |
|  | Total of IV. Semester | 30 |  |  |  |  |
|  | TOTAL OF SECOND YEAR | 60 |  |  |  |  |

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| **Third Year** | | | | | | | | | | | | |
| **V. Semester** | | | | | | | | | | | | |
| Code | Course Title | | | ECTS | | T+P | | Credit | | C/E | | Language |
| 504211802 | PhD THESIS STUDY | | | 25 | | 0+1 | | - | | **C** | | Turkish |
| 504211803 | SPECIALIZATION FIELD COURSE | | | 5 | | 3+0 | | - | | **C** | | Turkish |
|  | Total of V. Semester | | | 30 | |  | |  | |  | |  |
| **VI. Semester** | | | | | | | | | | | | |
| Code | | Course Title | | | ECTS | | T+P | | Credit | | C/E | Language |
| 504211802 | | PhD THESIS STUDY | | | 25 | | 0+1 | | - | | **C** | Turkish |
| 504211803 | | SPECIALIZATION FIELD COURSE | | | 5 | | 3+0 | | - | | **C** | Turkish |
|  | | | Total of VI. Semester | | 30 | |  | |  | |  |  |
|  | | TOTAL OF THIRD YEAR | | | 60 | |  | |  | |  |  |

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| **Fourth Year** | | | | | | |
| **VII. Semester** | | | | | | |
| Code | Course Title | ECTS | T+P | Credit | C/E | Language |
| 504211802 | PhD THESIS STUDY | 25 | 0+1 | **-** | **C** | Turkish |
| 504211803 | SPECIALIZATION FIELD COURSE | 5 | 3+0 | **-** | **C** | Turkish |
|  | Total of VII. Semester | 30 |  |  |  |  |
| **VIII. Semester** | | | | | | |
| Code | Course Title | ECTS | T+P | Credit | C/E | Language |
| 504211802 | PhD THESIS STUDY | 25 | 0+1 | **-** | **C** | Turkish |
| 504211803 | SPECIALIZATION FIELD COURSE | 5 | 3+0 | - | **C** | Turkish |
|  | Total of VIII. Semester | 30 |  |  |  |  |
|  | TOTAL OF FOURTH YEAR | 60 |  |  |  |  |

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| **Elective Courses** | | | | | | | |
| Code | Course Title | ECTS | T+P | Credit | C/E | Language | |
| 504212601 | [ADVANCED EDIBLE LEGUMES BREEDING](#EN14) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504211601 | [BIOSYNTHESIS OF THE MAJOR FOOD PRODUCTS](#EN25) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504211607 | [BREEDING OF MEDICINAL AND AROMATIC PLANTS](#EN33) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504211606 | [DYE PLANTS](#EN5) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504211603 | [GENETIC AND CYTOGENETIC OF THE EDIBLE LEGUMES](#EN35) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504211609 | [Hybrid Variety Breeding and Seed Production](#EN47) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504212606 | [METHODS FOR ANALYSING SECONDARY METABOLITS OF MEDICINAL AND AROMATIC PLANTS](#EN8) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504212603 | [PHYSIOLOGICAL APPPLICATIONS IN CEREAL BREEDING](#EN16) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504212602 | [PLANT BREEDING FOR STRESS ENVIRONMENTS](#EN30) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504211605 | [PLANT TISSUE CULTURE TECHNIQUES](#EN18) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504211608 | [POISONOUS PLANTS AND HERBAL POISONS](#EN46) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504211602 | [POST HARVEST PHYSIOLOGY IN PERISHABLE PLANT PRODUCT](#EN11) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504212604 | [RANGELAND ECOLOGY](#EN27) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504212608 | [REPRODUCTION IN FIELD CROPS](#EN42) | 7.5 | 3+0 | 3 | E | Turkish |
| 504211610 | [Resistance Breeding in Field Crops](#EN49) | 7.5 | 3+0 | 3 | E | Turkish | |
| 504212605 | [STRES PHYSIOLOGY IN FIELD CROPS](#EN15) | 7.5 | 3+0 | 3 | E | Turkish | |
|  | [Use of Quantitative Genetics in Plant Breeding](#EN50) | 7.5 | 3+0 | 3 | E | Turkish | |

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | FALL |

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| **COURSE** | | | |
| **CODE** | 504201520 | **TITLE** | DATA ANALYSİS AND INTERPRETATİON METHODS İN AGRİCULTURAL RESEARCH |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | - | 0 | | | 3 | 4 | COMPULSORY  (X ) | | ELECTIVE  (   ) | TURKISH |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | X | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | | 25 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | | 25 |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | NONE | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | **Determination of Purpose;** Determination of sucjects, aims and methods in research, evaluation of phenological, morphological and physiological data, **Data analysis methods;** Creation of charts and tables,cross-tables, histograms, multi purpose tables and charts, **Experimentation Techniques;** Completely randomised block designs, randomisation, randomised complete block designs, Latin square design, augmented design, one, two, three factor factorial designs, split,split-split factorial designs, **Coppatison Tests;** LSD, Duncan ve Student T comparison tests,orthomonal comparisons, **Population distributions;** Normal, binom and poisson distributions, **Hypotesis Tests;** Hypoteses, error typesri, one way, two ways tests, normal distributions, Z, T and chisquare tets, **Non-Parametric Tests;** Sign test, mann whitney-u test, wilcoxon test; colmonov smirnow test, hotelling test, **Regresyon ve Correlation;** Multi, linear, polinomynal, step-wise, logistic regresyons, path analysis, **One and Two Ways Variance Analyses;** One and Two Ways Variance Analyses; **Principal Component** **Analysis;** Evaluation and analsis techniques of principal component analysis, **Modelling Techniques;** What is modelling and modelling techniques, stocastic, mechanistic and deterministic modelling | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The aim of the course is to provide knowledge about  data analysis and interpretation methods in agricultural research in agriculture | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | - | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Know the importance data analysis and interpretation methods in agricultural research 2. Know data analysis and interpretation in research | | | | | | | |
| **TEXTBOOK** | | | | | - Özdamar, K., 1999, Paket Programlar ile İstatistiksel Veri Analizi-1, 2. Baskı, Kaan Kitabevi, 535 s.  - Özdamar, K., 1999, Paket Programlar ile İstatistiksel Veri Analizi-2, 2. Baskı, Kaan Kitabevi, 502 s.  - Yıldız, N., Bircan, H., 1991, Uygulamalı İstatistik, Atatürk Üniv., Ziraat Fak. Yay.,214 s.  - Akdeniz, F., Sakallıoğlu, S., Erol, H., Kaçıranlar, S., 2001, İstatistik, M.E.B. Yay. No: 3645, Ders Kit. Diz. No: 798, Ankara, 123 s.  - Dowdy, S. And S. Wearden. 1991. Statistics for Research. A Wiley-Interscience Publications, USA.  - Rees, D. 1995. Essential Statistics. Chapman & Hall, USA. Açıkgöz, N., Tarımda Araştırma ve Deneme, 1995, Ege Üniv. Ziraat Fak. Yay., 170 s. | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Determination of Purpose; Determination of sucjects, aims and methods in research, evaluation of phenological, morphological and physiological data, |
| 2 | Data analysis methods; Creation of charts and tables, cross-tables, histograms, multi purpose tables and charts, |
| 3 | Experimentation Techniques; Completely randomised block designs, randomisation, randomised complete block designs, Latin square design, augmented design, one, two, three factor factorial designs, split,split-split factorial designs, |
| 4 | Experimentation Techniques; Completely randomised block designs, randomisation, randomised complete block designs, Latin square design, augmented design, one, two, three factor factorial designs, split,split-split factorial designs, |
| 5 | Coppatison Tests; LSD, Duncan ve Student T comparison tests,orthomonal comparisons, |
| 6 | Mid-Term Examination 1 |
| 7 | Population distributions; Normal, binom and poisson distributions, Hypotesis Tests; Hypoteses, error typesri, one way, two ways tests, normal distributions, Z, T and chisquare tets, |
| 8 | Non-Parametric Tests; Sign test, mann whitney-u test, wilcoxon test; colmonov smirnow test, hotelling test, |
| 9 | Regresyon ve Correlation; Multi, linear, polinomynal, step-wise, logistic regresyons, path analysis, |
| 10 | Regresyon ve Correlation; Multi, linear, polinomynal, step-wise, logistic regresyons, path analysis, |
| 11 | Mid-Term Examination 2 |
| 12 | One and Two Ways Variance Analyses; One and Two Ways Variance Analyses; |
| 13 | Principal Component Analysis; Evaluation and analsis techniques of principal component analysis, |
| 14 | Modelling Techniques; What is modelling and modelling techniques, stocastic, mechanistic and deterministic modelling |
| 15,16 | Final Exam |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | | **X** |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | | **X** | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | | **X** | |  |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | | **X** |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **X** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **X** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | | **X** |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | | **X** |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  | **X** |
| **Prepared by :** | | | DOÇ. DR. MURAT OLGUN | **Date:** | | 07.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | FALL |

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| **COURSE** | | | |
| **CODE** | 504201522 | **TITLE** | ADVANCED BREEDING OF FIBER PLANTS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | - | - | | | 3 | 4 | COMPULSORY  ( X ) | | ELECTIVE  (   ) | TURKISH |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | X | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 1 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Importance of breeding on yield and quality in fiber plants, use of breeding methods in fiber plant breeding, application of breeding methods supported by classic and biotechnological breeding in fiber plants, determination of breeding methods in fiber plants according to pollination biology, introducing the importance and use of gene banks in novel genotype development. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To bring ability in use of classical and biotechnological breeding methods in fiber plant breeding. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Training qualified persons having information in breeding methods in fiber plants. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | - Teaching classical and biotechnological breeding methods.  - Teaching importance and use of genotypes in fiber plants.  - Informing about breeding methods that are used for fiber plants.  - Teaching importance of gene banks in fiber plants. | | | | | | | |
| **TEXTBOOK** | | | | | 1- Kara, K. 2014, lif bitkileri yetiştiriciliği ve ıslahı, Atatürk Üniversitesi Ziraat Fakültesi Yayınları, No: 292- Mert, M. 2009, lif bitkileri, Nobel yayıncılık, No: 1446, fen bilimleri: 96, ISBN: 978-605-395-243-53- Mert, M. 2011, doğal lif kaynaklı minör bitkiler, Nobel yayın no: 1625, Fen bilimleri 113, ISBN: 976-605-395-436-1 | | | | | | | |
| **OTHER REFERENCES** | | | | | 1- İncekara, F. 1979, Endüstri Bitkileri ve Islahı (lif bitkileri ve ıslahı), Ege üniversitesi ziraat fakültesi yayınları No: 65, Bornova İzmir2- Turgay, N. Baılleux, G. 1940, pamu ve Türkiye’de Ziraati, T.C. Ziraat Vekaleti, Neşriyat, Sayı: 306, Pamuk Serisi:3 | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Plant breeding methods |
| 2 | Plant breeding methods |
| 3 | Systematic of Cotton |
| 4 | Cotton breeding methods |
| 5 | Cotton breeding methods |
| 6 | Midterm Examination 1 |
| 7 | Cotton breeding methods |
| 8 | Introduction and selection breeding methods |
| 9 | Crossing and mutation methods |
| 10 | Polyploidy breeding and biotechnological applications in fiber plants breeding |
| 11 | Midterm Examination 2 |
| 12 | Breeding methods that are used for flax plant |
| 13 | Crossing breeding method in flax plant |
| 14 | Heterosis and mutation breeding in flax plant |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | | **X** |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | | **X** | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | | **X** |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | | **X** | |  |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **X** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **X** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | | **X** |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  | **X** |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | | **X** |  |
| **Prepared by :** | | | Yrd. Doç. Dr. Duran KATAR | **Date:** | | 13.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | SPRING |

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| **COURSE** | | | |
| **CODE** | 504201521 | **TITLE** | ORGANIC FARMING of MEDICINAL and AROMATIC PLANTS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | - | - | | | 3 | 4 | COMPULSORY  ( X ) | | ELECTIVE  ( ) | TURKISH |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | X | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 1 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Contents of organic farming, relationship between healthy life and environment, application of organic farming managements in medicinal and aromatic plants, control and certification techniques of organic medicinal and aromatic plants. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To provide information about organic farming in medicinal and aromatic plants. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To give information and to give vocational qualifications in production of organic farming in accordance with organic farming regulations. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | - Teaching organic farming regulations and applications  - Teaching production techniques in organic medicinal and aromatic plants  - Giving information about production in control and certification techniques of organic medicinal and aromatic plants. | | | | | | | |
| **TEXTBOOK** | | | | | 1- Er, C. ve Başalma D., 2008. Organik tarımdaki gelişmeler. Nobel Yayın No: 1354, Fen bilimleri: 88, ISBN:978-605-395-153-72- İlbaş, A. İ, 2009. Organik tarım ilkeleri ve ulusal mevzuat. Genel yayın no:1, Sertifika no: 12131, ISBN: 978-605-4160-08-2. Eflatun yayınevi3- Ceylan, A. , 1983. Tıbbi Bitkiler-II (Uçucu yağ bitkileri), Ege Üniversitesi Ziraat Fakültesi Yayın No:481, Bornova İzmir4- Baydar, H. 2013, tıbbi ve aromatik bitkiler bilimi ve teknolojisi, Süleyman Demirel Üniversitesi Ziraat Fakültesi Yayın No: 51, Isparta | | | | | | | |
| **OTHER REFERENCES** | | | | | 1- Baytop, T. 1999, Türkiye’de bitkiler ile tedavi (Geçmişte ve Bugün), Nobel tıp kitap evleri, 2. Baskı, ISBN: 975-420-021-1. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Organic farming contents |
| 2 | Applications of organic farming |
| 3 | Principles of organic plant production |
| 4 | Principles of organic plant production |
| 5 | Organic production of Thyme/Oregano |
| 6 | Midterm Examination 1 |
| 7 | Organik production of Nigella/Black Cumin |
| 8 | Organic production of Mint |
| 9 | Organic production of Lavander |
| 10 | Organic production of Rosemary |
| 11 | Midterm Examination 2 |
| 12 | Organic production of Sage |
| 13 | Organic production of Lemon Balm |
| 14 | Organic production of Coriander |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | | **X** |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | | **X** |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | | **X** | |  |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | | **X** | |  |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **X** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **X** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | | **X** |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | | **X** |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  | **X** |
| **Prepared by :** | | | Yrd. Doç. Dr. Duran KATAR | **Date:** | | 13.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504211606 | **TITLE** | DYE PLANTS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7.5 | COMPULSORY  (   ) | | ELECTIVE  (  x ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | x | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | |  |
| Quiz | | | | |  | |  |
| Homework | | | | | 5 | | 25 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (Seminar) | | | | | 5 | | 25 |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Definition, classification and history of dye plants, naturel dye plants with vegetal origin, colouring methods with naturel dye, origin, botanical characteristics, growth techniques of blue, red, yellow colour dyeing plants; other dyeing plants | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Giving information about the general situation, usage area and economical importance of dye plants, to introduce some dye plants which are used frequently in Turkey and in the World and to teach their growth techniques. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To be able to develop the proper models for the projects about development of industrial branches which uses dye plants | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | -to understand the importance of dye plants in agricultural production  -to understand the economical importance of dye plants  -to have information about the structural characteristics of dye plants  -to develop the proper models for the projects about development of industrial branches which uses dye plants  -to give recommendations to the producers  -to make synthesis about the production potential in the basis of regions | | | | | | | |
| **TEXTBOOK** | | | | | Non published material | | | | | | | |
| **OTHER REFERENCES** | | | | | 1. Natural dyes / Judy Hardman and Sally Pinhey Ramsbury : Crowood Press, c2009 2. Handbook of natural colorants / edited by Thomas Bechtold and Rita Mussak. Chichester : Wiley, 20093. Bitkilerden Elde Edilen Boyalarla Yün Liflerinin Boyanması, T.C. Sanayi ve Ticaret Bakanlığı, Küçük Sanatlar Sanayi Bölgeleri ve Siteleri Genel Müdürlüğü, Ankara, 1991.4. Üner Eyüboğlu, Itır Okaygün, Fusun Yaraş. Doğal boyalarla yün boyama : uygulamalı ve geleneksel yöntemler. İstanbul : Uygulamalı Eğitim Vakfı, 1983. 138 s. 5. [Dursun Güney](http://kitap.antoloji.com/dursun-guney/), [Feryal Ilgaz](http://kitap.antoloji.com/feryal-ilgaz/), [Mustafa Arlı](http://kitap.antoloji.com/mustafa-arli/), [Mustafa Demir](http://kitap.antoloji.com/mustafa-demir/), [Nezaket Adıgüzel](http://kitap.antoloji.com/nezaket-adiguzel/), [Nuran Kayabaşı](http://kitap.antoloji.com/nuran-kayabasi/), [Sebahattin Çelik](http://kitap.antoloji.com/sebahattin-celik/), [Tuna Ekim](http://kitap.antoloji.com/tuna-ekim/); Türkiye'de Yetişen Bazı Önemli Boya Bitkilerinin Üretim Teknikleri ve Elde Edilen Renklerin Haslık Dereceleri , Tokat Toprak Su Araştırma Enstitüsü, Tokat, 2006 6. [Recep Karadağ](http://www.kitapyurdu.com/yazar/default.asp?id=378024); Doğal Boyamacılık [Kültür ve Turizm Bakanlığı Yayınları](http://www.kitapyurdu.com/yayinevi/default.asp?id=4097), 128 s., 2007 | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | General information and importance about dye plants |
| 2 | Dyeing materials with vegetal origin, Colouring methods with naturel dye |
| 3 | Origin ,botanical characteristics, agriculture of blue colour dyeing plants |
| 4 | Origin, botanical characteristics, agriculture of blue colour dyeing plants |
| 5 | Origin, botanical characteristics, agriculture of red colour dyeing plants |
| 6 | Midterm Examination 1 |
| 7 | Origin, botanical characteristics, agriculture of red colour dyeing plants |
| 8 | Origin, botanical characteristics, agriculture of yellow colour dyeing plants |
| 9 | Origin, botanical characteristics, agriculture of yellow colour dyeing plants |
| 10 | The characteristics and agriculture of purple,orange and green colour dyeing plants |
| 11 | Midterm Examination 2 |
| 12 | The characteristics and agriculture of purple,orange and green colour dyeing plants |
| 13 | The characteristics and agriculture of brown and black colour dyeing plants |
| 14 | The characteristics and agriculture of brown and black colour dyeing plants |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | | **x** |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | | **x** |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | | **x** |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | | **x** |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | | **x** | |  |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | | **x** |  |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | | **x** | |  |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | | **x** | |  |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | | **x** |  |
| **Prepared by :** | | | Assist. Prof. Zehra AYTAÇ | **Date:** | | 06.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | Spring |

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| **COURSE** | | | |
| **CODE** | 504202519 | **TITLE** | ECOPHYSIOLOGICAL PRINCIPLES OF PLANT PRODUCTION |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7,5 | COMPULSORY  (   ) | | ELECTIVE  ( x  ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | x | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 2 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | | 1 | | 10 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Description of environmental factors and explanation their effects on plant physiological process and criticize them with respect to crop production | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The explanation of environmental factors on plant production with respect to plant physiological perspective | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | The crop production specialist can understand the effect of environmetal factors on crop plant physiology and the specialis can make more realistic crop management scedules | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | The student taken this course;  can learn environmental factor which affect plant growth  can undestand the role of environmental factors on plant physiology  can undestand the factor causes stres on plants  can select effective crop species and variety for different environmental condition  can understand plant-environment relationships | | | | | | | |
| **TEXTBOOK** | | | | | Unpublished course notes | | | | | | | |
| **OTHER REFERENCES** | | | | | Larcher W., 1995. Physiological Plant Ecology. Springer Inc., Berlin, 506 p Lambers, H. F.S. Chapin III and T.L. Pons, 2008.Plant Physiological Ecology. Springer Inc., NY. 604 p. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Description and approaches in ecophysiology |
| 2 | Plant environment |
| 3 | Relationships between plant and environment |
| 4 | Carbon metabolism of plant I |
| 5 | Carbon metabolism of plant II - Dry matter production |
| 6 | Midterm Examination 1 |
| 7 | Utilization of mineral elements I |
| 8 | Utilization of mineral elements II |
| 9 | Plant-Water relation I |
| 10 | Plant-Water relation II - Environmental influence of growth and development |
| 11 | Midterm Examination 2 |
| 12 | Seasonal changes of growth and development in plants |
| 13 | Plant under stress |
| 14 | Presentation of term paper |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | | **x** | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | | **x** | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  | **x** |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  | **x** |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **x** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **x** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | | **x** |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  | **x** |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  | **x** |
| **Prepared by :** | | | Prof.Dr. Ali KOÇ | **Date:** | | 05.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504212606 | **TITLE** | Methods for Analysing Secondary Metabolits of Medicinal and Aromatic Plants |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7.5 | COMPULSORY  (   ) | | ELECTIVE  (  x ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | x | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | |  |
| Quiz | | | | |  | |  |
| Homework | | | | | 5 | | 25 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (Seminar) | | | | | 5 | | 25 |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Secondary Metabolits, Essential Oils, Alkoloids, Glycosides. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The aims of this course can be defined as giving information about the formation of secondary metabolits, variability and properties and explanation of some of the active ingredient analysis at economically important medical and aromatic plants.their usage, economic importance and cultivation techniques. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Be able to obtain information about medicinal and aromatic plants having economic importance and its analysing methods | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Be able to know seconder plant metabolits characteristics  Be able to obtain information about medicinal and aromatic plants having economic importance  Be able to have knowlodge of general characteristics of essential oils and analysis methods  Be able to have knowlodge of methods of determinig essential oil compounds and chromatographic methods  Be able to have knowlodge of general characteristics of alkoloids and and analysis methods  Be able to have knowlodge of general characteristics of glycosides and analysis methods  Be able to have knowlodge of general characteristics of antioxidant and antimicrobial analysis methods  Be able to have knowlodge of methods of determinig hypericin analysis and spectrophotometric method | | | | | | | |
| **TEXTBOOK** | | | | | Non published material | | | | | | | |
| **OTHER REFERENCES** | | | | | Baydar, H., Tıbbi ve Aromatik Bitkiler Bilimi ve Teknolojisi (Genişletilmiş 4. Baskı). Süleyman Demirel Üniversitesi Yayın No: 51 (ISBN: 975-7929-79-4). 2013.Mammadov, R. Tohumlu Bitkilerde Sekonder Metabolitler , Nobel Yayınları:841, 412 s. Ankara.Başer, K. Hüsnü Can, and Gerhard Buchbauer, eds. Handbook of essential oils: science, technology, and applications. CRC Press, 2009.Ceylan, A., Tıbbi Bitkiler –II (Uçucu Yağ Bitkileri), E.Ü., Ziraat Fakültesi Yayını No: 481, Izmir, 1996. 306 s.Ceylan, A. İlaç bitkileri-III, Ayhan Ceylan, Ege Üniversitesi Ziraat Fakültesi Yayınları No: 509, İzmir, 1994, 163s.Taiz, L., Zeiger, E. (Çeviri Editörü: Prof. Dr. İsmail Türkan). Bitki Fizyolojisi. Palme Yayınları:455 (ISBN 978-9944-341-61-5). Ankara, 2008, 690 s. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Secondary Plant Materials, Their Characteristics and the uses of secondary substances |
| 2 | Formation and lokalization of Secondary Metabolits at Medicinal and Aromatic Plants |
| 3 | Classification of Medicinal and Aromatic Plants |
| 4 | Secondary Plant Materials and Their Variability |
| 5 | Essential Oils, General Characteristics and Analysis Methods |
| 6 |  |
| 7 | Important Medicinal and Aromatic Plants Containing Essential Oil  Determination of Essential Oil Compounds and Chromatographic Methods |
| 8 | Important Medicinal and Aromatic Plants Containing Alkoloids |
| 9 | General Characteristics and Analysis Methods of Alkoloids |
| 10 | Important Medicinal and Aromatic Plants Containing Glycosides,  General Characteristics and Analysis Methods of Glycosides |
| 11 |  |
| 12 | Antioxidant activity |
| 13 | Antimicrobial activity |
| 14 | Hypericin Analysis and Spectrophotometric Methods |
| 15,16 | Final Exam |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | | **x** | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | | **x** | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | | **x** | |  |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | | **x** | |  |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | | **x** | |  |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | | **x** |  |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | | **x** | |  |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | | **x** | |  |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | | **x** |  |
| **Prepared by :** | | | Assist. Prof. Zehra AYTAÇ | **Date:** | | 06.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | Autumn |

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| **COURSE** | | | |
| **CODE** | 504201517 | **TITLE** | General Prenciples of Forage Seed Production |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7,5 | COMPULSORY  (   ) | | ELECTIVE  ( x  ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | x | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 2 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | | 1 | | 10 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | In this course, the importance of seed production, seed technology, general principles of forage seed production, ecological conditions for seed production, harvest and storage techniques, seed production and certification techniques of major forage plants will be explained. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Providing theoretical knowledge about seed production of forage crops and its technology, marketing and use at graduate level | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To improve knowledge on seed production and technologies of forage Crops | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | The student taken this course;  can recognize the importance of forage seed production  can aware of different production techniques of forage crops  can discuss problems and solutions of seed productions  can give recommendations for forage seed production  can know and apply seed quality tests | | | | | | | |
| **TEXTBOOK** | | | | | Unpublished course notes | | | | | | | |
| **OTHER REFERENCES** | | | | | Moser et al Ed., 1996. Cool Season Grasses. ASA Publ., Madison, Wisconsin, USA  Barnes et al Edit, 2003. Forages. Iowa Univ. Press, Ames, Iowa, USA  National and international seed certification rules Various document in Turkish | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Importance of seed production of forages |
| 2 | Seed production and marketing in world and Turkey - Basic principles of seed production and general problems |
| 3 | Ecological and physiological principles |
| 4 | Germination and dormancy of seed |
| 5 | Selecting variety and seeding |
| 6 | Midterm Examination 1 |
| 7 | Weed management and pest control |
| 8 | Irrigation and fertilization |
| 9 | Pollination and seed setting |
| 10 | Seed harvest and after harvest management - Seed technology, drying and cleaning |
| 11 | Midterm Examination 2 |
| 12 | Certification and storage |
| 13 | Seed production of forage legumes |
| 14 | Seed production of forage grasses |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | | **x** | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | | **x** | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  | **x** |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  | **x** |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **x** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **x** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | | **x** |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  | **x** |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  | **x** |
| **Prepared by :** | | | **:** Prof.Dr. Ali KOÇ | **Date:** | | 07.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

|  |  |  |  |
| --- | --- | --- | --- |
| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | FALL |

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| **COURSE** | | | |
| **CODE** | 504211602 | **TITLE** | Post Harvest Physiology in Perishable Plant Product |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | - | 0 | | | 3 | 4 | COMPULSORY  ( X ) | | ELECTIVE  (   ) | TURKISH |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | X | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | | 25 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | | 25 |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | NONE | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | physiological changes in harvested products foods | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The goals of this course is to ensure processes and their mechanisms affecting physiological changes in harvested products foods. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | The goals of this course is to ensure processes and their mechanisms affecting physiological changes in harvested products foods | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1.Understanding of mechanism of physiological processes in postharvest perishible products.  2.Understanding of the effect of stress conditions in postharvest perishible products. | | | | | | | |
| **TEXTBOOK** | | | | | 1.Kays, S.J., 1991, Postharvest Physiology of Perishable Plant Products, An AVİ Book, New York, 532 pp.2. Hay, K.M., Walker, A.J., 1989, An Introduction to The Physiology of Crop Yield, Longman Scientific and Technical, New York, 292 pp. | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Pocesses and their mechanisms affecting physiological changes in harvested products foods |
| 2 | Nature and structure of postharvest products |
| 3 | Primary metabolic processes in harvested products |
| 4 | Development of tissues, specific developmental stages |
| 5 | metabolic considerations in harvested products |
| 6 | Midterm Examination 1 |
| 7 | Respiration, photosynthesis |
| 8 |  |
| 9 | Secondary metabolic processes and products; carbonhydrates, organic acits, protein and amino acits, lipids, plant pigments, volatile compounds, phenolic compounds, vitamins, phytohormones |
| 10 | Maturation, quality. stress in postharvest plant productS |
| 11 | Midterm Examination 2 |
| 12 | Nature of stress in relation to harvested products |
| 13 | Stress types, movement of gases and solutes |
| 14 | Relationship between environment and product |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | | **X** |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | | **X** |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  | **X** |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | | **X** |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | |  | **X** |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **X** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | | **X** |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | | **X** |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  | **X** |
| **Prepared by :** | | | DOÇ. DR. MURAT OLGUN | **Date:** | | 07.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | Spring |

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| **COURSE** | | | |
| **CODE** | 504212601 | **TITLE** | Advanced Edible Legumes Breeding |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 0 | 7,5 | COMPULSORY  (   ) | | ELECTIVE  ( x  ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | x | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 1 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Plant breeding, variation, plant breeding methods of autogam plants, been breeding (breeding goals, breeding methods), pea breeding (breeding goals, breeding methods), broad been breeding (breeding goals, breeding methods), cowpea breeding (breeding goals, breeding methods), chickpea breeding (breeding goals, breeding methods), lentil breeding (breeding goals, breeding methods). | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The main aim of the course is to provide basic knowledge about plant breeding and learn of breeding goals and methods at edible legumes. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Know to breeding methods of edible legumes. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Know the plant breeding methods of autogam plants 2. Know the breeding goals of edible legumes 3. Know the breeding methods of edible legumes 4. Know the classical breeding methods | | | | | | | |
| **TEXTBOOK** | | | | | Şehirali, S. 1988. Yemeklik tane Baklagiller, Ankara Üniversitesi Ziraat Fakültesi, Yayın No: 1089. | | | | | | | |
| **OTHER REFERENCES** | | | | | Azkan, N. 2002. Yemeklik Tane Baklagiller, Uludağ Üniversitesi Ziraat Fakültesi, Yayın No: 40 | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Plant breeding, variation, introduction, single seed selection, bulk selection |
| 2 | Hybridisation, mature selection at hybridisation, hybridisation technique |
| 3 | Single seed selection at hybridisation, bulk selection at hybridisation, back hybridisation |
| 4 | Been breeding goals, been breeding methods (introduction, single seed selection) |
| 5 | Been breeding methods (bulk selection, hybridisation breeding) Been breeding methods (single seed selection at hybridisation, bulk selection at hybridisation, back hybridisation, mutation breeding) |
| 6 | Midterm Examination 1 |
| 7 | Pea breeding goals, pea breeding methods (hybridisation technique, mutation breeding) |
| 8 | Broad been breeding goals, broad been breeding methods (ıntroduction, bulk selection, heterosis) |
| 9 | Broad been breeding methods (hybrid broad been seed production, male sterility, synyhetic variety, recurrent selection) |
| 10 | Cowpea breeding goals, cowpea breeding methods (pedigree methods, population breeding) |
| 11 | Midterm Examination 2 |
| 12 | Chickpea breeding goals, chickpea breeding methods (introduction, selection) Chickpea breeding methods (hybridisation, pedigree methods, bulk methods) |
| 13 | Lentil breeding goals, lentil breeding methods (selection, hybridisation) |
| 14 | Lentil breeding methods (hybridisation technique) |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | | **x** | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | | **x** | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  | **x** |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  | **x** |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **x** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **x** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | | **x** |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  | **x** |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  | **x** |
| **Prepared by :** | | | Assoc. Prof. Nihal Kayan | **Date:** | | 05.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504212605 | **TITLE** | Stres Physiology in Field Crops |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | | 0 | 0 | | | 3 | 4 | COMPULSORY  ( x ) | | ELECTIVE  (   ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
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| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | | 25 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (practise) | | | | |  | | 25 |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | The purpose of this course is to give students advanced information about stress physiology of horticultural field crops. In the context of this course, description and effects of stress factors in plant physiology are discussed. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | he physiology of salt stress and tolerance, drought stress and tolerance of the horticultural crops, cool stress and tolerance physiological | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Know the effect and results of stres may be occured in field crops | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1.Learn plant stress concept in advanced level  2.Learn and classifies the plant stress factors  3.Describe plant stress factors  4.Learn the effects of stress factors on plant growth and development | | | | | | | |
| **TEXTBOOK** | | | | | Blum, A., 1998. Plant Breeding for Stress Environments. CRC Press Inc. Boca Raton, Florida, 221 p.Salisbury, F.B., Ross, C.W., 1992. Plant Physiology. Wadsworth Pub. Co. Belmont, California, 682 p. Heyne, E.S., 1987. Wheat and Wheat Improvement. Am. Soc. of Agr. Inc. Madison, Wisconsin, USA, 763 p | | | | | | | |
| **OTHER REFERENCES** | | | | | Olien, C.R., Smith, M.N., 1981. Analysis and Improvement of Plant Cold Hardiness.215 p | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | The content and importance of the course |
| 2 | Descriptions and concepts |
| 3 | Stress factors-I |
| 4 | Stress factors-II |
| 5 | Effects of stress factors-I |
| 6 | Midterm Examination 1 |
| 7 | Effects of stress factors-II |
| 8 | Defense mechanisms in stress physiology-I |
| 9 | Defense mechanisms in stress physiology-II |
| 10 | Defense mechanisms in stress physiology-III |
| 11 | Midterm Examination 2 |
| 12 | Tolerance, resistance, adaptation-I |
| 13 | Tolerance, resistance, adaptation-II |
| 14 | Discussion of recent studies in stress physiology |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS MSc PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES (MSc)** | **3**  High | **2**  Mid | **1**  Low |
| **LO 1** | Specialization on topics of cultivation, breeding, physiology and genetics of the field crops (Cereals and Legumes, Industrial Crops, Rangeland and Forage Crops) that were thought during undergraduate education. |  |  |  |
| **LO 2** | Giving priority to biodiversity, sustainability and interaction between cultivation and environment and to create public awareness on these issues |  |  |  |
| **LO 3** | Developing various approaches on agricultural techniques to ensure standardization, quality and productivity of field crops |  |  |  |
| **LO 4** | To determine the national problems related to the branch, to do comparative analysis and to produce solutions to the problems by evaluating the information |  |  |  |
| **LO 5** | Having knowledge on the new techniques and technologies and innovative issues about Field Crops, to be able to create new ideas and ability of lifelong learning |  |  |  |
| **LO 6** | The ability of management and interpret the behavior of the field crops under field and stress conditions |  |  |  |
| **LO 7** | To be able to conduct and conclude a scientific research, prepare a scientific publication and present the results. |  |  |  |
| **LO 8** | To gain the ability to study in laboratories and in the field related to the branch and evaluates the data by using appropriate statistical method. |  |  |  |
| **LO 9** | The ability of interdisciplinary teamwork and to follow the national and international literature |  |  |  |
| **LO 10** | Taking responsibility being initiative and having creativity skills |  |  |  |
| **LO 11** | Being professional and having ethical responsibility |  |  |  |
| **LO 12** | Using his/her knowledge for the benefit of science and society |  |  |  |

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| **Prepared by :** | Prof. Dr. Murat Olgun | **Date:** | 25.08.2015 |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | Autumn |

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| **COURSE** | | | |
| **CODE** | 504201516 | **TITLE** | NATURAL RESOURCES MANAGEMENT |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7,5 | COMPULSORY  (   ) | | ELECTIVE  ( x  ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | x | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 2 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | | 1 | | 10 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Description of natural resources on worldwide. Explaining the pressure on natural resources and introduction of sustainable natural resource management principles | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Definition of natural resources on worldwide and introduction to sustainable natural resource management practices. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | The specialist can understand sustainable use of natural resources regarding good and services. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | The student taken this course;  can learn current situation of world natural resources  can understand the importance of sustainable use of natural resource  can understand the importance of of integrated natural resource management  can understand detrimental effect of uncontrolled management practices on natural resources  can aware of environmental problems. | | | | | | | |
| **TEXTBOOK** | | | | | Un published course notes | | | | | | | |
| **OTHER REFERENCES** | | | | | Holechek, J. L., R. A. Cole, J. T. Fisher and R. Valdez, 2003. Natural Resources Ecology, Economics, and Policy. Prentice Hall, NJ761 p. Ffolliott, P.F., L.A. Bojorquez-Tapia and M. Hernandez-Narvaez, 2001. Iowa Univ. Press, IO, 237 p. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Importance and description of natural resources |
| 2 | Description of the relation between climate and natural resources |
| 3 | Watershed and water management I |
| 4 | Watershed and water management II |
| 5 | Forest management and agroforestry practices |
| 6 | Midterm Examination 1 |
| 7 | Fire management |
| 8 | Pest management |
| 9 | Sustainable agriculture |
| 10 | Grazingland management |
| 11 | Midterm Examination 2 |
| 12 | Fishery management |
| 13 | Biodiversity ant its importance |
| 14 | Endangered species - Presentation of term paper |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | | **x** | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | | **x** | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  | **x** |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  | **x** |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **x** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **x** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | | **x** |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  | **x** |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  | **x** |
| **Prepared by :** | | | Prof.Dr. Ali KOÇ | **Date:** | | 07.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | Fall |

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| **COURSE** | | | |
| **CODE** | 504211605 | **TITLE** | Plant tissue culture techniques |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7,5 | COMPULSORY  (   ) | | ELECTIVE  ( x ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | x | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | | 30 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | | 20 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Application of plant tissue culture and widely used methods | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The purpose of this course is to emphasize the importance of plant tissue culture techniques and reveal practice possibilities of actual area. In addition, this course supports to detailed practice and information about further areas of application of plant tissue culture techniques as to use this new technology for difficult or impossible to solve the problems of the breeding to combine classical breeding and plant tissue culture techniques | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | This course will initially teach basics of plant cell and tissue culture in the laboratory. In addition to using tissue culture in plant breeding course, the students will learn to multiply plant lines, production of hybrids using sterile plants, the gene bank storage techniques, genetic engineering and genetic transfer techniques, production of haploid and dihaploid plants and production of disease free plants etc. Along with many other aspects. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Learn the basic technique of tissue culture laboratory. 2. The students will have more detailed information about tissue culture methods. 3. The students have a experience that learned new techniques put into practice. 4. This course supports conventional breeding methods combined with the use of plant tissue culture techniques | | | | | | | |
| **TEXTBOOK** | | | | | 1. Bitki biyoteknoljisi\_Doku kültürü ve uygulamaları (M. Babaoğlu, S. Özcan ve E. Gürel) 2. Plant Tissue Culture: Theory and Practice (S.S. Bhojwani, M.K. Razdan) | | | | | | | |
| **OTHER REFERENCES** | | | | | Plant Tissue Culture Engineering (S. Dutta Gupta (Editor), Yasuomi Ibaraki (Editor) ) | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Definition and historical development of plant tissue culture |
| 2 | Applications of plant tissue culture methods |
| 3 | Basic laboratory techniques |
| 4 | Preparation and sterilization of culture media |
| 5 | Plant growth regulators used in tissue culture media |
| 6 | Midterm Examination 1 |
| 7 | Orgonogenesis and somatic embryogenesis |
| 8 | Protoplast culture and somatic hybridization |
| 9 | Haploid plant production |
| 10 | Disease-free plant production |
| 11 | Midterm Examination 2 |
| 12 | The production of secondary metabolites |
| 13 | Micropropagation |
| 14 | Embryo culture and somaclonal variation |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | | **x** | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | | **x** |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | | **x** |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | | **x** | |  |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **x** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **x** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | | **x** |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | | **x** | |  |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | | **x** |  |
| **Prepared by :** | | | Doç.Dr. Süleyman AVCI | **Date:** | | 11.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | FALL |

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| **COURSE** | | | |
| **CODE** | 504211601 | **TITLE** | Biosynthesis of The Major Food Products |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | - | 0 | | | 3 | 4 | COMPULSORY  ( X ) | | ELECTIVE  (   ) | TURKISH |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | X | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | | 25 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | | 25 |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | NONE | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Biosynthesis of The Major Food Products | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The biosynthesis of the product, formation properties and the understanding of these mechanisms | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Biosynthesis of ambitions products , formation properties and the understanding of this mechanism and ensure the exchange of product formation in different conditions. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Understanding of mechanism of major food products.  Understanding of chances in food products under different conditions. | | | | | | | |
| **TEXTBOOK** | | | | | 1.Biosynthesis of The Major Crop Products. Philip John. Department of Agricultural Botany University of Reading, UK. Wiley Biotechnology Series.2. Kays, S.J., 1991, Post harvest Physiology of Perishable Plant Products, An AVİ Book, New York, 532 pp | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Sucrose, sucrose biosynthesis, accumulation |
| 2 | Biotechnological development |
| 3 | Starch, starch granule |
| 4 | The biochemical pathway of starch biosynthesis |
| 5 | starch synthase mutants |
| 6 | Midterm Examination 1 |
| 7 | Fructan, fruct structure, accumulation of biochemical pathways of biosynthesis |
| 8 | Fructan depolymerization of storage |
| 9 | Cellular localization of fructan metabolism , biotechnological development |
| 10 | Cellulose; The structure of cellulose fibers |
| 11 | Midterm Examination 2 |
| 12 | Participation in the cellulose cell wall biosynthesis, biotechnological development |
| 13 | Oils, vegetable oils, synthetic chemistry |
| 14 | Protein , natural plant storage proteins , biosynthesis , biotechnological development |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | | **X** | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | | **X** |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  | **X** |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | | **X** | |  |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **X** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | | **X** |  |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | | **X** | |  |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | | **X** |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | | **X** | |  |  |
| **Prepared by :** | | | DOÇ. DR. MURAT OLGUN | **Date:** | | 07.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | Fall |

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| **COURSE** | | | |
| **CODE** | 504201519 | **TITLE** | POPULATION GENETICS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | - | 0 | | | 3 | 4 | COMPULSORY  ( X ) | | ELECTIVE  (   ) | TURKISH |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | X | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | | 25 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | | 25 |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | NONE | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Introduction to population genetics Mendelian genetics Qualitative and quantitative genetics Quantitative genetic prediction methods Application of Hardy-Weinberg equation. Deviations from Hardy-Weinberg equation Calculation methods of gene frequencies and crossbreeding Sex-linked inheritance Calculation of gene frequencies in case of Linkage Calculation of allele frequencies in case of multiple gene Recessive against the selection, heterozygote selection in favor and against Random deviations Hardy-Weinberg equation Effective population size, migration and mutation Components of phenotypic variance, Selection, and inbreeding | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The main aim of the course is to examine properties of population (to research existing similarities/dissimilarities and their causes and heritabilities) | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | - | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Know the importance of population genetics 2. Know the properties of population genetics   Know the applicability of methods of population genetics in stress environments | | | | | | | |
| **TEXTBOOK** | | | | | -Yıldırım, M.B., Dere Ş., 2005, Populasyon Genetiği, Ege Üniv. Ziraat Fak. Yay.,305 s.-Introduction to Quantative Genetics (4 th edition) Pearson Education Limited England.[8] Principles of Population Genetics Daniel L. Hartl (Author), Andrew G. Clark (Author)-Akyel, R., Kırcalıoğlu, A., Korkut, K.Z., 1982, kantitatif Genetiğe Giriş ve Diallel Analizler, Ege Zirai Araş. Enst. Yay. No: 20 115 s. | | | | | | | |
| **OTHER REFERENCES** | | | | | Sleper, D.A., Poehlman, J.M., Breeding Field Crops, Wiley, 424 pp. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to population genetics |
| 2 | Mendelian genetics |
| 3 | Qualitative and quantitative genetics |
| 4 | Quantitative genetic prediction methods |
| 5 | Application of Hardy-Weinberg equation. Deviations from Hardy-Weinberg equation |
| 6 | Mid-Term Examination 1 |
| 7 | Calculation methods of gene frequencies and crossbreeding and Sex-linked inheritance |
| 8 | Calculation of gene frequencies in case of Linkage |
| 9 | Calculation of allele frequencies in case of multiple gene |
| 10 | Recessive against the selection, heterozygote selection in favor and against |
| 11 | Mid-Term Examination 2 |
| 12 | Random deviations |
| 13 | Hardy-Weinberg equation |
| 14 | Effective population size, migration and mutation, components of phenotypic variance, Selection, and inbreeding |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | | **X** |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | | **X** | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | | **X** | |  |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | | **X** |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **X** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **X** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | | **X** |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | | **X** |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  | **X** |
| **Prepared by :** | | | DOÇ. DR. MURAT OLGUN | **Date:** | | 07.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | Spring |

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| **COURSE** | | | |
| **CODE** | 504212604 | **TITLE** | RANGELAND ECOLOGY |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7,5 | COMPULSORY  (   ) | | ELECTIVE  ( x  ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | x | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 2 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | | 1 | | 10 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Explain of the environmental factor on plant formation in rangelands, the role of environmental factors on selecting range improvement methods and describe the principles of sustainable use of rangelands considering plant animal interference | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Identification rangeland types, explain the factors affects rangeland plant formation and explain plant-animal interference | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | The student taken this course can make more realistic range management and improvement schedule and can understand ecological functions of rangeland ecosystems | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | The student taken this course  Can understand the role of environmental factor on natural succession on rangelands  Can understand the function of rangelands resources for sustainable natural resource management  Can make effective range management plans  Can select effective range improvement techniques considering environmental factors  Can establish an environmentally friendly plant-animal interference | | | | | | | |
| **TEXTBOOK** | | | | | Un published course notes | | | | | | | |
| **OTHER REFERENCES** | | | | | Altın, M., A. Gökkuş ve A. Koç, 2011. Çayır ve Mera Yönetimi I. ve II. Cilt T.C. Tarım Bak Yayınları  Heady H.F. and R.D. Child, 1994ç ç Rangeland Ecology and managementWestview Press  Holechek, J.R., R. Pieper and C.H. Herbel, 2004. Range management Principles and practices. Prentice Hall, Publ. Lemaire G., J. Hodgson, .de Moraes, P.C. de F., Carvalho and C. Nabinger, 2000. Grassland Ecophysiology and Grazing Ecology. CABI Publ. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | The functions of rangelands |
| 2 | Classification rangeland types |
| 3 | Nutrient cycle and energy flow in rangeland ecosystems |
| 4 | The effect of climate on plant cover and the factors which cause degradation on rangelands |
| 5 | Secondary succession |
| 6 | Midterm Examination 1 |
| 7 | Rangeland condition, health and class |
| 8 | Plant - animal interference |
| 9 | Planning of grazing season and grazing systems |
| 10 | Animal distribution |
| 11 | Midterm Examination 2 |
| 12 | Alternative techniques in grazing plans |
| 13 | Forage planning for year-round |
| 14 | Presentation term paper |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | | **x** | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | | **x** | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  | **x** |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  | **x** |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **x** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **x** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | | **x** |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  | **x** |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  | **x** |
| **Prepared by :** | | | Prof.Dr. Ali KOÇ | **Date:** | | 07.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | SPRİNG |

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| **COURSE** | | | |
| **CODE** | 504212602 | **TITLE** | Plant Breeding for Stress Environments |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | - | 0 | | | 3 | 4 | COMPULSORY  ( X ) | | ELECTIVE  (   ) | TURKISH |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | X | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | | 25 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | | 25 |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | NONE | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Description of stress conditions, plant breeding and yield stability, breeding for drought resistance, breeding for heat resistance, breeding for cold resistance, breeding for mineral nutrients, breeding for salt resistance, genotype-environment interaction, and genetical-statistical explanation of this subject | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The main aim of the course is to provide knowledge and ability to find scientific and practical solution to problems at plant breeding in stress environments | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | |  | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1.Know the importance of plant breeding in stress environments  2.Know the properties of plant breeding of cereals in stress environments  3.Know the basis plant breeding methods in stress environments | | | | | | | |
| **TEXTBOOK** | | | | | Blum, A., 1998. Plant Breeding for Stress Environments. CRC Press Inc. Boca Raton, Florida, 221 p. Salisbury, F.B., Ross, C.W., 1992. Plant Physiology. Wadsworth Pub. Co. Belmont, California, 682 p. Heyne, E.S., 1987. Wheat and Wheat Improvement. Am. Soc. of Agr. Inc. Madison, Wisconsin, USA, 763 p. | | | | | | | |
| **OTHER REFERENCES** | | | | | Olien, C.R., Smith, M.N., 1981. Analysis and Improvement of Plant Cold Hardiness.215 p | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Description ofstress conditions |
| 2 | Plant breeding and yield stability |
| 3 | Plant breeding and yield stability |
| 4 | Breeding for drought resistance |
| 5 | Breeding for drought resistance |
| 6 | Midterm Examination 1 |
| 7 | Breeding for heat resistance |
| 8 | Breeding for cold resistance |
| 9 | Breeding for waterlogging resistance |
| 10 | Breeding for mineral nutrients, breeding for salt resistance |
| 11 | Midterm Examination 2 |
| 12 | Breeding for mineral nutrients, breeding for salt resistance |
| 13 | Genotype-environment interaction, and genetical-statistical explanation of this subject |
| 14 | General evaluation |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | | **X** | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | | **X** |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | | **X** |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  | **X** |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **X** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **X** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | |  | **X** |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | | **X** |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | | **X** | |  |  |
| **Prepared by :** | | | DOÇ. DR. MURAT OLGUN | **Date:** | | 07.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | Autumn |

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| **COURSE** | | | |
| **CODE** | 504211603 | **TITLE** | Genetic and Cytogenetic of the Edible Legumes |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7,5 | COMPULSORY  (   ) | | ELECTIVE  (x  ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | x | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 1 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Chromosome works, morphology and recognition criterions; karyotype analysis; cytologi and genetic of chickpea; cytologi and genetic of lentil; cytologi and genetic of broad been; cytologi and genetic of been; | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The main aim of the course is to knowledge basic concept about genetic and cytogenetic and learn of genetic and cytogenetic at edible legumes. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Recognize to edible legumes’s cell. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Know the basic concept about genetic and cytogenetic 2. Know the karyotypes analysis 3. Know the former works about genetic and cytogenetic of edible legumes 4. Know the genetic and cytogenetic of edible legumes | | | | | | | |
| **TEXTBOOK** | | | | | Adak, M.S. 2000. Yemeklik Tane Baklagillerin Genetik ve Sitogenetiği, Ankara Üniversitesi Ziraat Fakültesi Tarla Bitkileri Bölümü Ders Notları | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Recognize to plant breeding, genetic, cytogenetic, chromosome, gene; chromosome works |
| 2 | Genetic conclusions of meiosis, chromosome morphology |
| 3 | Chromosomes recognition criterions; karyotype analysis |
| 4 | Chickpea cytologi, chickpea karyotype analysis, chickpea polyploidy |
| 5 | Observe techniques of chickpea chromosome, tissue culture of chickpea |
| 6 | Midterm Examination 1 |
| 7 | Chickpea genetic (leaf shape, plant structure, stem and leaf color, flower color) Chickpea genetic (seed and cotyledon color, pod shape, genes of biological nitrogen fixation, disease resistence genes) |
| 8 | Chickpea genetic (linkage, correlation and path analysis, plant type, chickpea heterosis) |
| 9 | Lentil cytologi |
| 10 | Lentil genetic (cotyledon color, flower color, flower number, seed color, epicotyl color) |
| 11 | Midterm Examination 2 |
| 12 | Lentil genetic (growing shape, pod split, genetic of quantitative charecters) Broad been cytologi |
| 13 | Broad been genetic (plant charecteristics, leaf charecteristics, flower charecteristics, pod charecteristics, seed charecteristics) |
| 14 | Been cytologi, been genetic (stem, leaf, flower, pod, seed) |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | | **x** | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | | **x** | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  | **x** |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  | **x** |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | | **x** |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  | **x** |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | | **x** | |  |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | | **x** |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  | **x** |
| **Prepared by :** | | | Assoc. Prof. Nihal Kayan | **Date:** | | 05.05.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** | Fall |

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| **COURSE** | | | |
| **CODE** |  | **TITLE** | SCIENTIFIC PROJECT AND ARTICLE PREPARATION TECHNIQUE |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7.5 | COMPULSORY  (  X ) | | ELECTIVE  (   ) | TURKISH |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | X | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 1 | | 30 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | | 1 | | 30 |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 40 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Description and importance of scientific projects, project preparation progress, implementation of the project, preparation of scientific articles | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To teach the scientific project and article preparation and implementation techniques | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To learn the agricultural scientific projects and article progress | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Makes the definition of projects  Learns the stages of project preparation  Learns how to reach the previous knowledge and technologies in the project preparation  Gains information on the transfer of a project prepared to implement | | | | | | | |
| **TEXTBOOK** | | | | | Timur, M., ve F. Çağıltay 2008. Proje Hazırlama Tekniği. Nobel Yayınları No: 1347, 201s. | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Definition and importance of the projects |
| 2 | Scientific projects and their contents |
| 3 | Chapters of the scientific projects |
| 4 | Identifying project subject and collection information about the subject |
| 5 | Determination of scientific materials and methods |
| 6 | Midterm Examination 1 |
| 7 | Preparation of work plan for scientific projects |
| 8 | Determining project budget |
| 9 | Evaluation of scientific project |
| 10 | Screening of scientific articles in field crops |
| 11 | Midterm Examination 2 |
| 12 | Literature review for scientific articles |
| 13 | Tranformation of the scientific projects to article |
| 14 | Writing a sample article |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | |  |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  |  |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | |  |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  |  |
| **Prepared by :** | | | Assoc.Prof. Mehmet Demir KAYA | **Date:** | | 02.06.2015 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** |  | **TITLE** | Field Crop Ecology |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | | - | 0 | | | 3 | 4 | COMPULSORY  ( x ) | | ELECTIVE  (   ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | x | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | | 25 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | | 25 |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Agricultural Ecology, relationships between ecology light, temperature, moisture, soil factors, agronomy of field csops and ecological regions. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | relationships between environment factors and ecological factors | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | This relationship by studying interaction between individual plants and their environment or by way of the interaction of whole communities and environment | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. To teach ecology concept  2. To teach the ecological needs and classification of field crops  3. Ecological problems of field crops  4. Environmental pollution | | | | | | | |
| **TEXTBOOK** | | | | | Gençtan, T., 2012. Tarımsal Ekoloji. T.C. Namık Kemal Üniversitesi Yayınları. Ders Kitabı yayın No:3, TekirdağSencar, Ö., Gökmen, S., 1996. Tarımsal Ekoloji. Tokat Ziraat Fakültesi Yayınları No. 8, Ders Notları Serisi No. 3, TOKATKocataş A., 1994. Ekoloji ve Çevre Biyolojisi, Ege Üniversitesi Fen Fakültesi Ders Kitabı, Seri No: 42, 564 s. | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Ecology, ecology of field crops |
| 2 | Ecosysteams |
| 3 | Ecological factors |
| 4 | Light, temperature, moisture |
| 5 | soil, biotic, fire |
| 6 | Midterm Examination 1 |
| 7 | Climate and vegetation |
| 8 | Field crops and environment factors |
| 9 | The interactions of genotype and environment |
| 10 | The ecophysiological factors |
| 11 | Midterm Examination 2 |
| 12 | The ecological factors on field crops production |
| 13 | Biological factors |
| 14 | The ecological regions of field crops in our country |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS MSc PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES (MSc)** | **3**  High | **2**  Mid | **1**  Low |
| **LO 1** | Specialization on topics of cultivation, breeding, physiology and genetics of the field crops (Cereals and Legumes, Industrial Crops, Rangeland and Forage Crops) that were thought during undergraduate education. |  |  |  |
| **LO 2** | Giving priority to biodiversity, sustainability and interaction between cultivation and environment and to create public awareness on these issues |  |  |  |
| **LO 3** | Developing various approaches on agricultural techniques to ensure standardization, quality and productivity of field crops |  |  |  |
| **LO 4** | To determine the national problems related to the branch, to do comparative analysis and to produce solutions to the problems by evaluating the information |  |  |  |
| **LO 5** | Having knowledge on the new techniques and technologies and innovative issues about Field Crops, to be able to create new ideas and ability of lifelong learning |  |  |  |
| **LO 6** | The ability of management and interpret the behavior of the field crops under field and stress conditions |  |  |  |
| **LO 7** | To be able to conduct and conclude a scientific research, prepare a scientific publication and present the results. |  |  |  |
| **LO 8** | To gain the ability to study in laboratories and in the field related to the branch and evaluates the data by using appropriate statistical method. |  |  |  |
| **LO 9** | The ability of interdisciplinary teamwork and to follow the national and international literature |  |  |  |
| **LO 10** | Taking responsibility being initiative and having creativity skills |  |  |  |
| **LO 11** | Being professional and having ethical responsibility |  |  |  |
| **LO 12** | Using his/her knowledge for the benefit of science and society |  |  |  |

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| **Prepared by :** | Assist.Prof.Dr. Zekiye Budak Başçiftçi | **Date:** |  |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | Joint Course for the Institute | **SEMESTER** | Fall-Spring |

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| **COURSE** | | | |
| **CODE** | 501011101 | **TITLE** | The Scientific Research Methods and Its Ethics |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| MSc-  Ph.D | 3 | | 0 | 0 | | | 3+0 | 7,5 | COMPULSORY  ( X ) | | ELECTIVE  (   ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
| 1,5 | | 1,5 | | | |  | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 1 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Science, the scientific thought and other fundamental concepts, the scientific research process and its techniques, Methodology: Data Collecting-Analysis-Interpretation, Reporting the scientific research (Preparation of a thesis, oral presentation, article, project), Ethics, Ethics of scientific research and publication. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The main objectives are: To examine the foundations of scientific research and the scientific research methods, to teach the principles of both the methodology and the ethics, to realize the process on a scientific research and to evaluate the results of research, to teach reporting the results of research (on a thesis, presentation, article). | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Applying the scientific research methods and the ethical rules in their professional life. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Gaining awareness on ethical principles at basic research methods, becoming skillful at analyzing and reporting the data obtained in scientific researches, being able to have researcher qualification with occupational sense of responsibility, having the scientific and vocational ethics’ understanding and being able to defend this understanding in every medium. | | | | | | | |
| **TEXTBOOK (Turkish)** | | | | | Karasar, N. (2015). Bilimsel Araştırma Yöntemi. Nobel Akademi Yayıncılık, Ankara. | | | | | | | |
| **OTHER REFERENCES** | | | | | **1-**Büyüköztürk, Ş., Çakmak, E. K., Akgün, Ö. E., Karadeniz, Ş., Demirel, F. (2012). Bilimsel Araştırma Yöntemleri. Pegem Akademi Yayınevi, Ankara.  **2-**Tanrıöğen, A. (Editör). (2014). Bilimsel Araştırma Yöntemleri. Anı Yayıncılık, Ankara.  **3-**Türkiye Bilimler Akademisi Bilim Etiği Komitesi. Bilimsel Araştırmada Etik ve Sorunları, Ankara: TÜBA Yayınları, (2002).  **4-**Ekiz, D. (2009). Bilimsel Araştırma Yöntemleri: Yaklaşım, Yöntem ve Teknikler. Anı Yayıncılık, Ankara.  **5-**Day, Robert A. (Çeviri: G. Aşkay Altay). (1996). Bilimsel Makale Nasıl Yazılır ve Nasıl Yayımlanır?, TÜBİTAK Yayınları, Ankara.  **6-**Özdamar, K. (2003). Modern Bilimsel Araştırma Yöntemleri. Kaan Kitabevi, Eskişehir.  **7-**Cebeci, S. (1997). Bilimsel Araştırma ve Yazma Teknikleri. Alfa Basım Yayım Dağıtım, İstanbul.  **8-**Wilson, E. B. (1990). An Introduction to Scientific Research. Dover Pub. Inc., New York.  **9-**Çömlekçi, N. (2001). Bilimsel Araştırma Yöntemi ve İstatistiksel Anlamlılık Sınamaları. Bilim Teknik Kitabevi, Eskişehir. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Science, scientific thought and other basic concepts (University, history of university, higher education, science, scientific thought and other related concepts) |
| 2 | Science, scientific thought and other basic concepts (University, history of university, higher education, science, scientific thought and other related concepts) |
| 3 | The scientific research and its types (Importance of the scientific research, types of science, scientific approach) |
| 4 | The scientific research process and its techniques (Access to the scientific knowledge, literature search, determining the research issue, definition of the problem, planning) |
| 5 | The scientific research process and its techniques (Access to the scientific knowledge, literature search, determining the research issue, definition of the problem, planning) |
| 6 | The scientific research process and its techniques (Access to the scientific knowledge, literature search, determining the research issue, definition of the problem, planning) |
| 7 | The method and the approach: Collecting, analysis and interpretation of the data (Data, data types, measurement and measurement tools, collecting data, organizing data, summarizing data, analysis and the interpretation of data) |
| 8 | The method and the approach: Collecting, analysis and interpretation of the data (Data, data types, measurement and measurement tools, collecting data, organizing data, summarizing data, analysis and the interpretation of data) |
| 9 | Finalizing the scientific research (Reporting, preparing the thesis, oral presentation, preparing an article and a project) |
| 10 | Finalizing the scientific research (Reporting, preparing the thesis, oral presentation, preparing an article and a project) |
| 11 | Finalizing the scientific research (Reporting, preparing the thesis, oral presentation, preparing an article and a project) |
| 12 | Ethics, scientific research and publication ethics (Ethics, rules of ethics, occupational ethics, non-ethical behaviors) |
| 13 | Ethics, scientific research and publication ethics (Ethics, rules of ethics, occupational ethics, non-ethical behaviors) |
| 14 | Ethics, scientific research and publication ethics (Ethics, rules of ethics, occupational ethics, non-ethical behaviors) |
| 15,16 | Mid-term exam, Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE INSTITUTE’S GRADUATE PROGRAMME’S LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (M.Sc.-Ph.D.)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Having the scientific and vocational ethics’ understanding and being able to defend this understanding in every medium. | | |  | |  |  |
| **LO 2** | Being able to have researcher qualification with occupational sense of responsibility. | | |  | |  |  |
| **LO 3** | Becoming skillful at analyzing and reporting the data obtained in scientific researches. | | |  | |  |  |
| **LO 4** | Gaining awareness on ethical principles at basic research methods. | | |  | |  |  |
| **Prepared by :** | | |  | **Date:** | | 14.06.2016 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** |  | **TITLE** | REPRODUCTION IN FIELD CROPS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7,5 | COMPULSORY  (   ) | | ELECTIVE  ( X ) | TURKISH |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | X | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | | 10 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | The tremendous diversity among flowering plants is the result of sexual reproduction that starts with flowering and results in the formation of seeds. This key process is under strict genetic and molecular control, but is also adapted to the environment. These course will be mentioned ecological and genetic factors affecting reproduction of field crops. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | In this course, a knowledge will be given about base of reproductive biology of flowering plants, flower biotecnology and applications of molecular techniques in plant breeding and biotechnology understanding of the principles of plant reproduction | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Today, biotechnological methods have been widely used in plant breeding. It is especially important to learn the genetic and molecular concepts related to reproductive systems of plants and adapt them to plant breeding with biotechnological applications. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Students are expected to be able to:  - to learn basic concepts about plant reproduction;  - recognize and describe the latest trends in plant reproduction;  - transform basic research results into plant breeding;  - produces and writes the views of a relevant research topic. | | | | | | | |
| **TEXTBOOK** | | | | | 1. Donald E. Fosket (1994) Plant Growth and Development—A Molecular Approach. Harcourt Brace & Company, U.S.A2. Stephen H. Howell. (1998) Molecular Genetics of Plant Development. Cambridge University Press, UK3. Johri B.M. (1984). Embryology of Angiosperms. Springer-Verlag, Berlin Heidelberg | | | | | | | |
| **OTHER REFERENCES** | | | | | Walter R & Henry H. Hadley (Eds). Fehr (1990). Hybridization of Crop Plants. American Society of Agronomy; First edition. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Plant Reproductive Systems-Reproduction mechanisms in flowering plants. |
| 2 | Male reproductive system I: anter structure, meiosis and microsporogenesis, pollen mitosis; productive and sperm cells; pollen maturation. |
| 3 | Male reproductive system II: mature pollen grain, structure and function; pollen viability, pollen germination, pollen tubes. |
| 4 | Female reproductive system I: pistil development, structure and function, stigma receptivity, style and ovary; types and viability of ovule |
| 5 | Female reproductive system II: meiosis and megasporogenesis, mitosis and megagametogenesis; embryo sac formation |
| 6 | Midterm Examination 1 |
| 7 | Pollination and fertilization systems I: genetic and ecological concepts |
| 8 | Pollination and Fertilization Systems II: factors affecting pollination and fertilization in field crops |
| 9 | Male sterility: cytoplasmic and nuclear male sterility; usage possibilities for field crop improvement |
| 10 | Sexual and asexual seed formation: embryo sacs and embryos formation without fertilization; apomixis: diplosporia, aposporia and adventitious embryos; usage possibilities for improvement of field crops |
| 11 | Midterm Examination 2 |
| 12 | Control of flower and seed development: developmental control genes, factors affecting flowering and seed formation in field crops |
| 13 | Molecular applications in plant reproduction I: identification of genes important in plant reproduction and their function, anter and pollen specific genes and their regulation |
| 14 | Molecular applications in plant reproduction II: Genetic engineering applications in male sterility |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | |  |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  |  |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | |  |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  |  |
| **Prepared by :** | | | ASSOCIATE PROF. DR. SÜLEYMAN AVCI | **Date:** | |  | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** |  | **TITLE** | Resistance Breeding in Field Crops |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7,5 | COMPULSORY  (   ) | | ELECTIVE  ( x ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
| x | |  | | | |  | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 1 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | In this course; The concept and scope of resistance breeding, mechanisms of resistance, the role of morphological, physiological and genetic structure of plants in resistance, breeding for resistance to diseases in grains, sources of heredity and resistance, evaluations of resistance to diseases, resistance to winter, drought, heat, pre-harvest germination, lodging and grain shed, etc. topics will be discussed. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To teach the knowledge and techniques related to the genotypic improvement of the resistance of plants against adverse conditions. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Considering the importance of human and environmental health in field crops, it will be ensured that experts in the field are trained by emphasizing the importance of developing new varieties resistant to biotic and abiotic stress conditions, understanding the breeding methods to be used, determining the sensitivity levels in artificial conditions, and the functioning of the resistance mechanism. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Gain knowledge about resistance breeding.  2. Learns how to develop resilience.  3. Comprehends the basic principles of resistance breeding.  4. Comprehends the mechanism of resistance to biotic stresses.  5. He/she improves himself/herself in breeding resistance to abiotic stresses.  6. Learns innovative approaches in resistance breeding.  7. Uses the theoretical knowledge of the field by transferring it into practice. | | | | | | | |
| **TEXTBOOK** | | | | | Plant Breeding for Biotic Stress Resistance, 2012, Edited by Roberto Fritsche-Neto, Aluízio Borém | | | | | | | |
| **OTHER REFERENCES** | | | | | Abiotic Stresses, Plant Resistance Through Breeding and Molecular Approaches, 2005, Edited By M. Ashraf, Philip Harris | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Definition and Importance of Resistant Breeding |
| 2 | Genetic Basis of Plant Resilience |
| 3 | Gene sources in resistance breeding |
| 4 | Endurance Test Methods |
| 5 | Disease and Resilience Assessments |
| 6 | Endurance Breeding Methods |
| 7 | Endurance Breeding Methods |
| 8 | Midterm Exam |
| 9 | New Technologies in Endurance Breeding |
| 10 | New Technologies in Endurance Breeding |
| 11 | Pest Resistance Breeding |
| 12 | Drought and Cold Resistance Breeding |
| 13 | Seed Spillage and Lodging resistance |
| 14 | Maintaining Endurance |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | |  |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  |  |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | |  |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  |  |
| **Prepared by :** | | | Assoc. Prof. Dr. İmren Kutlu | **Date:** | | 15.04.2022 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** |  | **TITLE** | Hybrid Variety Breeding and Seed Production |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7,5 | COMPULSORY  (   ) | | ELECTIVE  ( x ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
|  | |  | | | | x | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 1 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Genetic mechanisms of hybrid cultivar breeding, heterosis, heterobeltiosis, inbred line development and general and special combinatorial ability, sterility types, F1 hybrid cultivar types, seed production techniques | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To learn the genetic principles of hybrid breeding,  To understand the basic principles and applications in hybrid cultivar,  To teach breeding techniques and methods used in hybrid breeding,  To learn seed production methods in hybrid varieties | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To learn the development processes of hybrid varieties and their seed production methods in field crops  To train specialized engineers needed by the seed industry  To train the academic staff needed by R&D institutions and universities | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Learning and applying hybrid variety breeding stages  To have knowledge about the changing and developing breeding processes and to gain lifelong practice skills.  To understand the basic principles of hybrid breeding and to be able to think about the problems and find solutions.  Comprehending new developments and techniques in hybrid breeding  To be able to use hybrid breeding methods for self and cross-pollinated plants in projects for variety breeding | | | | | | | |
| **TEXTBOOK** | | | | | Kingsbury, N. 2009. Hybrid: The History and Science of Plant Breeding.Şehirali, S., Özgen M. 1988. Bitki Islahı. Ankara Üniversitesi ZF yayınları: 1059 Ders Kitabı: 310, Ankara. 261s. Genç, İ., Yağbasanlar, T., 1994. Bitki Islahı. Ç.Ü.Z.F. Genel Yayın no:59, Ders Kitapları Yayın no: 13. Adana. 150s. Baydar, H. 2007. Genetik (Bitki Genetiği ve Islahı). SDÜ Ziraat Fakültesi, Yayın no: 23. Isparta. McDonald, M.B., Copeland, L.O. 1997. Seed Production Principles and Practices. Chapman and Hall, NY. 643p. | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Definition, importance and purpose of breeding and hybrid concept |
| 2 | Obtaining genetic variation |
| 3 | Inbreeding and development of inbred lines |
| 4 | Determination of the combination abilities of inbred lines |
| 5 | Male sterility types and their use in hybrid breeding |
| 6 | Heterosis and heterobeltiosis |
| 7 | Hybrid variety types |
| 8 | Transferring of new characteristics to parent lines |
| 9 | Hybrid variety breeding in self-pollinated plants |
| 10 | Seed production in hybrid varieties |
| 11 | Isolation distance and seed standards in hybrid cultivars |
| 12 | Hybrid variety breeding in sunflower |
| 13 | Hybrid variety breeding in sugar beet |
| 14 | Hybrid variety breeding in cotton and canola |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | |  |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  |  |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | |  |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  |  |
| **Prepared by :** | | | Prof.Dr. Mehmet Demir KAYA | **Date:** | | 20.04.2022 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** |  | **TITLE** | POISONOUS PLANTS AND HERBAL POISONS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7.5 | COMPULSORY  (   ) | | ELECTIVE  ( X ) | TURKISH |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
| X | | X | | | |  | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | | 1 | | 30 |
| Quiz | | | | |  | |  |
| Homework | | | | | 1 | | 20 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | According to category, the most poisonous and very poisonous plants will be introduced in Turkey and the world. Also, the ingredients and growing habits of these plants will be explained. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The poisonous plants in nature and cultivated areas will be introduced and recognized so far in the history and nowadays. And the differences from similar plants will be explained. The chemical components which are poisonous of these plants will be represented. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | The poisonous species in the nature and cultivated areas will be distinguished by taking this course. Thus, possible problems will have done put away with this course. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | The course taking students will identify better the plants.  They will distinguish the poisonous plants from others.  They will recognize the poisons and learn struggle with them.  They will use economically these plants, and therapy some illness and use as ornamental plants. | | | | | | | |
| **TEXTBOOK** | | | | | Giftpflanzen und Pflanzengiften | | | | | | | |
| **OTHER REFERENCES** | | | | | Harmful Herbs, Kosmos Naturführer | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Describing of poison, poisoning, poisonous plants and poisonous materials |
| 2 | Causing poisoning Factors and vegetable materials |
| 3 | General introducing the poisonous plants in Turkish Flora |
| 4 | The poisonous plants at the world drug sector |
| 5 | The poisonous plants as ornamental in the world |
| 6 | Very poisonous plants (aconite and daphne species), ingredients and poisoning symptoms |
| 7 | Very poisonous plants (devil's apple and henbane species), ingredients and poisoning symptoms |
| 8 | Very poisonous plants (tobacco species and deadly nightshade), ingredients and poisoning symptoms |
| 9 | Very poisonous plants (savin and golden rain), ingredients and poisoning symptoms |
| 10 | Very poisonous plants (columbine, fool's parsley, hemlock), ingredients and poisoning symptoms |
| 11 | Very poisonous meadow saffron and snakeshead species, ingredients and poisoning symptoms |
| 12 | Solomon's seal and privet, ingredients and poisoning symptoms |
| 13 | Oleander and periwinkle species, ingredients and poisoning symptoms |
| 14 | Corncockle, angelica, bryony and box species, ingredients |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | |  |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  |  |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | |  |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  |  |
| **Prepared by :** | | | Prof. Dr. Ahmet GÜMÜŞÇÜ | **Date:** | | 14.06.2021 | | | |

**Signature**:

**T.R.**

**ESKISEHIR OSMANGAZI UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**

**COURSE INFORMATION FORM**

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| **DEPARTMENT** | **FIELD CROPS (PhD)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504212610 | **TITLE** | Use of Quantitative Genetics in Plant Breeding |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **PhD** | 3 | | 0 | 0 | | | 3 | 7,5 | COMPULSORY  (   ) | | ELECTIVE  ( x ) | Turkish |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Knowledge in the discipline**  **[if it contains considerable design content, mark with (√)]** | | | | | | |
| x | |  | | | |  | | | | | | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Basic mathematics, genetics and statistics applications in plant breeding studies. interpretation of the results in terms of plant breeding, quantitative genetics, inbreeding covariances, estimation of variance and covariance from trial data, and learning effective selection criteria | | | | | | | |
| **COURSE OBJECTIVES** | | | | | In this course, it is aimed to improve students' knowledge about the use of quantitative genetics in plant breeding. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | It will enable students to reach basic information in this field by creating and developing the resources needed in special plant breeding. It will provide specialization in cultivar development with the methods to be used in the breeding of quantitative characters with economic importance. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1) Ability to identify, define, research and solve problems on related topics; for this purpose, gaining the ability to select and apply appropriate scientific analytical methods and modeling techniques  2) Ability to select and use modern techniques and tools necessary for practice; Gaining the ability to use information technologies effectively  3) Acquiring the ability to plan experiments, conduct experiments, collect data, evaluate data biometrically, and interpret the findings in terms of plant breeding in plant genetics and breeding, plant biotechnology, seed growing, in field and laboratory conditions.  4) Gaining the ability to determine the appropriate material and method for the effective recognition of the environment related to the application area  5) Gaining the ability to take responsibility individually and work with disciplined teams  6) Gaining awareness of professional and ethical responsibility  7) Gaining the awareness and skills to prioritize the protection of the environment and biological diversity, to inform and warn the society on these issues  8) Being aware of the universal and societal implications of their solutions and practices; Being aware of entrepreneurship and innovation issues and having knowledge about the problems of the age and having the experience and knowledge | | | | | | | |
| **TEXTBOOK** | | | | | Yıldırım, M. B. Öztürk, A. İkiz, F. Püskülcü, H. 1979. Statistical-Genetic Methods in Plant Breeding. Publications of Aegean University. | | | | | | | |
| **OTHER REFERENCES** | | | | | 1. Wricke,G. and W.E. Weber, 1986. Quantitative Genetics and Selection in Plant Breeding. Walter de Gruyter Co., Berlin2. Kang, M. S. 2002. Quantitative Genetics, Genomics and Plant Breeding. CABI Books3. Balding, D. J., Bishop, M., Cannings, C. 2007. Handbook of Statistical Genetics. John Wiley & Sons, Ltd, England. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to Quantitative Genetics |
| 2 | Basic Linear Relationships |
| 3 | Multiple Regression and Correlation |
| 4 | Relationships Between Relatives |
| 5 | Detection of Variance Components in Cross Pollinated Plants and Their Role in Plant Breeding |
| 6 | Detection of Variance Components in Self Pollinated Plants and Their Role in Plant Breeding |
| 7 | Diallel Hybrid Analysis |
| 8 | Midterm Examination |
| 9 | Line x Tester Hybrid Analysis |
| 10 | Heritability, Genetic Advance and Heterosis Concepts |
| 11 | Genes and Genetic Markers |
| 12 | Quantitative Trait Loci Analyzes |
| 13 | Genotype X Environmental Interaction and Stability Parameters |
| 14 | Selection of Quantitative Traits |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE FIELD CROPS PhD PROGRAM LEARNING OUTCOMES** | | | | **CONTRIBUTION LEVEL** | | | |
| **NO** | **LEARNING OUTCOMES (PhD)** | | | **3**  High | | **2**  Mid | **1**  Low |
| **LO 1** | Development, expansion and deepening skills related to the expertise areas gained in graduate level | | |  | |  |  |
| **LO 2** | Ability to define, analyze and solve the complex problems within their branch in Field Crops by using their knowledge | | |  | |  |  |
| **LO 3** | Ability to plan and conduct a scientific research related to their branch, analyze the data and prepare a scientific publication. | | |  | |  |  |
| **LO 4** | To develop new ideas and thoughts by using modern techniques and tools in the field crops | | |  | |  |  |
| **LO 5** | To access, evaluate and interpret information used in different area and apply it in their expertise field | | |  | |  |  |
| **LO 6** | The ability of oral and written communication with the researchers in Field Crops or different areas at least in one of foreign languages | | |  | |  |  |
| **LO 7** | Self-development to understand the importance of life-long learning and to follow the science-technology and contemporary issues in their branch | | |  | |  |  |
| **LO 8** | Ability to transfer the information to academic environment and to implement public awareness | | |  | |  |  |
| **LO 9** | Ability to be creative, to take initiative, to make independent decisions and to lead team work | | |  | |  |  |
| **Prepared by :** | | | Assoc. Prof. Dr. İmren Kutlu | **Date:** | | 03.11.2022 | | | |

**Signature**: