**FIELD CROPS MSc 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+0 | 3 | **C** | Turkish |
| 504201529 | [Climate change and crop productivity](#EN50) | 7.5 | 3+0+0 | 3 | **C** | Turkish |
|  | Elective Course-1 | 7.5 | 3+0+0 | 3 | E | Turkish |
|  | Elective Course-2 | 7.5 | 3+0+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+0 | 3 | E | Turkish |
|  | Elective Course-4 | 7.5 | 3+0+0 | 3 | E | Turkish |
|  | Elective Course-5 | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202001 | Seminar | 7.5 | 0+1+0 | - | **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 |
| 504201702 | MSc THESIS STUDY | | 25 | | 0+1+0 | - | **C** | Turkish |
| 504201703 | SPECIALIZATION FIELD COURSE | | 5 | | 3+0+0 | - | **C** | Turkish |
|  | | Total of III. Semester | 30 |  | |  |  |  | |
| **IV. Semester** | | | | | | | | | |
| Code | | Course Title | ECTS | T+P | | Credit | C/E | Language | |
| 504201702 | | MSc THESIS STUDY | 25 | 0+1+0 | | - | **C** | Turkish | |
| 504201703 | | SPECIALIZATION FIELD COURSE | 5 | 3+0+0 | | - | **C** | Turkish | |
|  | | Total of IV. Semester | 30 |  | |  |  |  | |
|  | | TOTAL OF SECOND YEAR | 60 |  | |  |  |  | |

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| **Elective Courses** | | | | | | | | | |
| Code | Course Title | | | | ECTS | T+P | Credit | C/E | Language |
| 504201533 | [Adaptation Mechanisms to Abiotic Stress in Plants](#EN46) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201522 | [ADVANCED BREEDING OF FIBER PLANTS](#EN2) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202518 | [ADVANCED BREEDING OF STARCH and SUGAR PLANTS](#EN13) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202513 | [ADVENCED BREEDING OF FORAGE CROPS](#EN20) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201514 | [AROMATIC PLANTS](#EN4) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201518 | [COMPUTER BASED ANALYSIS OF FIELD EXPERIMENT RESULTS](#EN22) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201515 | [CULTIVATION AND BREEDING OF INDUSTRIAL PURPOSED OIL PLANTS](#EN6) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 505302518 | [CURRENT APPROACHES IN FIELD FARMING PROBLEMS](#EN55) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201520 | | [DATA ANALYSIS AND INTERPRETATION METHODS IN AGRICULTURAL RESEARCH](#EN1) | | 7.5 | | 3+0+0 | 3 | **C** | Turkish |
| 504202517 | [DRUG PLANTS](#EN12) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202523 | [DRY FARMING SYSTEMS](#EN43) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202519 | [ECOPHYSIOLOGICAL PRINCIPLES OF PLANT PRODUCTION](#EN7) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201523 | | | [FIELD CROP ECOLOGY](#EN38) | | 7.5 | 3+0+0 | 3 | E | Turkish | |
| 504201507 | [FIELD CROPS PHYSIOLOGY](#EN32) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201528 | [FORAGE QUALITY AND THE AFFECTİNG FACTORS](#EN51) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201517 | [GENERAL PRENCIPLES OF FORAGE SEED PRODUCTION](#EN10) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202516 | [GENETICS AND CYTOGENETICS OF OIL CROPS](#EN34) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201513 | [INDUSTRIAL CROPS FOR BIOFUELS](#EN24) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201532 | [MEDICINAL AND AROMATIC GEOPHYTES](#EN48) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201516 | [NATURAL RESOURCES MANAGEMENT](#EN17) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202529 | [New Trends in Plant Breeding](#EN56) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201521 | [ORGANIC FARMING of MEDICINAL and AROMATIC PLANTS](#EN3) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202515 | [PLANT CYTOGENETIC METHODS](#EN19) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201519 | [POPULATION GENETICS](#EN26) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202510 | [QUALITY IN CEREALS](#EN31) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202522 | [RANGELAND VEGETETION SURVEY AND EVALUATION](#EN41) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202511 | [SEED PHYSIOLOGY](#EN21) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202524 | [SILAGE PLANT PRODUCTION AND TECHNOLOGY](#EN52) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202520 | [SOIL AND PLANT ANALYSIS](#EN9) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202512 | [SPECIFIC CULTIVATION AND BREEDING OF OILSEED CROPS](#EN23) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201524 | | | [SPECIFIC GROWING TECHIQUES AND BREEDING IN WINTER CEREALS](#EN37) | | 7.5 | 3+0+0 | 3 | E | Turkish | |
| 504202526 | [SPICE PLANTS AND BREEDING](#EN47) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202509 | [SUMMER CEREALS BREEDING](#EN29) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201525 | [SUSTAINABLE AGRICULTURE](#EN44) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201531 | [Use of Artificial Intelligence in Agriculture](#EN54) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201530 | [Use of Biostimulators in Agriculture](#EN53) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504201527 | [USE OF MICROORGANISMS IN FIELD CROPS](#EN45) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202528 | [Use of Quantitative Genetics in Plant Breeding](#EN49) | | | | 7.5 | 3+0+0 | 3 | E | Turkish |
| 504202508 | [WINTER CEREALS BREEDING](#EN28) | | | | 7.5 | 3+0+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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504201514 | **TITLE** | Aromatic Plants |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | |  | |  |
| Seminar | | | | | 5 | | 25 |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | The contents of the course are the importance of essential oil, their usage,the general characteristics, methods of essential oil analysis, introduction of the families of aromatic plants, definition, cultivation and the use of İris germanica, Jasminum grandiflorum, Lavandula spp, Ocimum basilicum, Rosmarinus officinalis, Rosa damascena and Lippia citridora. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Giving information about the general situation, usage area and economical importance of aromatic plants, and to teach their growth techniques. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | The students will have an approach to the importance, uses, secondery metabolites and cultivation of the most significant aromatic plants. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | -to understand the importance in agricultural production of Aromatic plants  -to understand the economical importance of Aromatic plants  -to have information about the plant characteristics of Aromatic plants  -to make synthesis about the production potential in the basis of regions | | | | | | | |
| **TEXTBOOK** | | | | | Tıbbi Bitkiler –II (Uçucu Yağ Bitkileri)/ Ayhan Ceylan, E.Ü., Ziraat Fakültesi Yayını No: 481, Izmir, 1996. | | | | | | | |
| **OTHER REFERENCES** | | | | | Tıbbi, aromatik ve keyf bitkileri : bilim ve teknolojisi / Hasan Baydar Isparta : Süleyman Demirel Üniversitesi Ziraat Fakültesi, 216 s. 2005.Essential oil crops / E. A. Weiss. Wallingford : CAB International, XI, 600 s, c1997.Volatile oil crops : their biology, biochemistry, and production / edited by Robert K. M. Hay and Peter G. Waterman. Essex : Longman Scientific & Technical, XIV, 185 s, 1993.Handbook of essential oils : science, technology, and applications / K. Hüsnü Can Başer, Gerhard Buchbauer. Boca Raton : CRC Press, XII, 975 s., 2010.Medicinal and aromatic plants : cultivation and uses / Suresh Muralia, Akshey Kumar Pathak.Jaipur [India] : Aavishkar Publishers, 2007.Duft-und Aromapflanzen : 100 duftende Kräuter für Gesundheit und Schönheit / Bruno P. Kremer.Stuttgart : Franckh, 1988.Cultivation and utilization of aromatic plants / edited by C.K. Atal & B.M. Kapur.Yammu-Tawi, [Hindistan] : Regional Research laboratory, Council of Scientific & Industrial Research, c1982. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | General information about aromatic plants, history, importance and usage |
| 2 | Economical importance of aromatic plants in the World and in Turkey |
| 3 | Harvesting, drying and drog preperation of aromatic plants |
| 4 | Secondary metabolites (essential oils, tannins, bitter components etc.) of aromatic plants |
| 5 | Quality criteria of aromatic plants, essential oils and their characteristics |
| 6 | Midterm Examination 1 |
| 7 | Lavander (Lavandula angustifolia): taxonomy, usage, morphology, agronomy |
| 8 | Rose (Rosa damascena) : taxonomy, usage, morphology, agronomy |
| 9 | Jasmine (Jasminum grandiflorum) : taxonomy, usage, morphology, agronomy |
| 10 | Lemon grass (Lippia citridora) : taxonomy, usage, morphology, agronomy |
| 11 | Midterm Examination 2 |
| 12 | iris (İris germanica) : taxonomy, usage, morphology, agronomy |
| 13 | Rosemary (Rosmarinus officinalis) : taxonomy, usage, morphology, agronomy |
| 14 | Basil (Ocimum basilicum L) : taxonomy, usage, morphology, agronomy |
| 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. 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** |  |

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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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504201515 | **TITLE** | CULTIVATION AND BREEDING OF INDUSTRIAL PURPOSED OIL PLANTS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | To give general imformations and breeding methods in endustrial purposed oil plants | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Giving imformation on endustial purposed oil plants and their cultivation methods. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Training of persons for subject of renewable sources and endustrial purposed plants. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Training of persons for subject of renewable sources and endustrial purposed plants. | | | | | | | |
| **TEXTBOOK** | | | | | Oil Crops, Editors; Johann Vollmann and Istvan Rajcan. ISBN: 978-0-387-77593-7, 2009, Newyork-USA. | | | | | | | |
| **OTHER REFERENCES** | | | | | Yağ bitkileri yetiştirme ve ıslahı. Prof. Dr. Halis Arıoğlu, Çukurova Üniversitesi. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | General imformation about oil crop production. |
| 2 | General imformation about breeding of oil crops. |
| 3 | Camelina (Camelina sativa) cultivation. |
| 4 | Camelina (Camelina sativa) breeding. |
| 5 | Crambe (Crambe sp.) cultivation |
| 6 | Midterm Examination 1 |
| 7 | Crambe (Crambe sp.) breeding |
| 8 | Cephalaria (Cephalapda syriaca) cultivation |
| 9 | Cephalaria (Cephalapda syriaca) breeding |
| 10 | Jatuopha (J. Curcas L.) cultivation |
| 11 | Midterm Examination 2 |
| 12 | Jatuopha (J. Curcas L.) breeding |
| 13 | Eruca sativa cultivation |
| 14 | Eruca sativa breeding |
| 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 :** | 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** | 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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504202520 | **TITLE** | Soil and Plant Analysis |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 (√)]** | | | | | | |
|  | | 0 | | | |  | | | | | | |
| **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** | | | | | To gain soil and plant analysis knowledge | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Learning the basic principles and concepts of soil and plant analysis | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To gain knowledge and experience, practices about soil and plant analysis | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Upon successful completion of this course, the students will be able to;  1) take representative samples from soil , 2) take representative samples from plants, 3) evaluate the analysis results of soil 4)evaluate the analysis results of plant | | | | | | | |
| **TEXTBOOK** | | | | | 1) Toprak analizleri (2012). Prof.Dr. Burhan Kacar. Nobel Yayınları. 2) Bitki analizleri (2008). Prof.Dr. Burhan Kacar ve Prof. Dr. Ali İnal, Nobel Yayınları | | | | | | | |
| **OTHER REFERENCES** | | | | | 1) Handbook of reference methods for plant analysis (1998). Edited by Yash P. Karla. ISBN 1-57444-124-8 2) Methods for Plant Analysis. A Guide for Conducting Plant Analysis in Missouri (2006). Manjula V. Nathan and Yichang Sun University of Missouri-Columbia | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Basic principles of soil analysis |
| 2 | Soil samples collection and preparation |
| 3 | Soil texture analysis |
| 4 | Lime, pH and salt analysis in soil |
| 5 | Organic mater and N analysis in soil |
| 6 | Midterm Examination 1 |
| 7 | K, P and micro element analysis in soil |
| 8 | Interpretation of soil analysis results |
| 9 | Plant samples collection and preparation |
| 10 | Milling and digessions of plant samples |
| 11 | Midterm Examination 2 |
| 12 | Nitrogen, K and P analyses in plant samples |
| 13 | Microelement (Fe,Cu,Zn,Mn) analysis in plant samples |
| 14 | Interpretation of plant analysis results and fertilizer suggestions for crops |
| 15,16 | Final Examination |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE** **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** | 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 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 |  |  |  |

**Prepared by:** Assoc. Prof. Hatice DAĞHAN **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** | 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**

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| **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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504202517 | **TITLE** | Drug Plants |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | |  | |  |
| Seminar | | | | | 5 | | 25 |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | The contents of the course are the importance of drug plants, their usage,the general characteristics, methods of analysis, introduction of the families of drug plants, definition, cultivation and the use of Atropa belladonna, Datura stramonium L., Datura metel, Hyosyamus niger,Withania somnifera, Digitalis lanata, Digitalis purpurea L. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Giving information about the general situation, usage area and economical importance of drug plants, and to teach their growth techniques. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | The students will have an approach to the importance, uses, secondery metabolites and cultivation of the most significant drug plants. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | -to understand the importance in agricultural production of Drug plants  -to understand the economical importance of Drug plants  -to have information about the plant characteristics of Drug plants  -to make synthesis about the production potential in the basis of regions | | | | | | | |
| **TEXTBOOK** | | | | | Tıbbi Bitkiler –III (İlaç Bitkileri)/ Ayhan Ceylan, E.Ü., Ziraat Fakültesi Yayını No: 509, Izmir, 1994. | | | | | | | |
| **OTHER REFERENCES** | | | | | Tıbbi, aromatik ve keyf bitkileri : bilim ve teknolojisi / Hasan Baydar Isparta : Süleyman Demirel Üniversitesi Ziraat Fakültesi, 216 s. 2005. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | General information about drug plants, history, importance and usage |
| 2 | Economical importance of drug plants in the World and in Turkey |
| 3 | Secondary metabolites of drug plants |
| 4 | Secondary metabolites of drug plants |
| 5 | Quality analysis of drug plants |
| 6 | Midterm Examination 1 |
| 7 | Atropa belladonna: taxonomy, usage, morphology, agronomy |
| 8 | Datura metel L : taxonomy, usage, morphology, agronomy |
| 9 | Hyosyamus niger : taxonomy, usage, morphology, agronomy |
| 10 | Withania somnifera : taxonomy, usage, morphology, agronomy |
| 11 | Midterm Examination 2 |
| 12 | Digitalis lanata : taxonomy, usage, morphology, agronomy |
| 13 | Digitalis purpurea L : taxonomy, usage, morphology, agronomy |
| 14 | Plants with flavaoides etc.. : taxonomy, usage, morphology, agronomy |
| 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. 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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504202518 | **TITLE** | ADVANCED BREEDING OF STARCH and SUGAR PLANTS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | To develope novel cultivars, having high yield and quality, resistant to biotic and abiotic stress is important to meet the need of starch and sugar for industry. It is important to take into account and apply novel and sophisticate breeding methods and pollination biologies of starch and sugar plants. This course will give opportinity to gain necessary imformation about genetics, cytogenetics and breeding methods of starch and sugar plants. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To give imformation about genetics, cytogenetics and breeding methods of starch and sugar plants. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To give imformation about genetics, cytogenetics and breeding methods of starch and sugar plants. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Learning of genetics, cytogenetics and breeding methods of starch and sugar plants. | | | | | | | |
| **TEXTBOOK** | | | | | Tugay, M.E., 1997, Özel Bitki Islahı, GOPU, Ziraat Fak.Yay. 162S.KOÇ, H., 1999, Şeker Pancarı, GOPU, Ziraat Fak.Yay. 230 s. | | | | | | | |
| **OTHER REFERENCES** | | | | | Er, C., ve Uranbey, S., 2009, Nişasta ve Şeker Bitkileri A.Ü. Ziraat Fak. Yay. 344 s | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Morphology and physiology of starch and sugar plants |
| 2 | Morphology and physiology of starch and sugar plants |
| 3 | Breeding methods of starch and sugar plants |
| 4 | Breeding methods of starch and sugar plants |
| 5 | Breeding methods of starch and sugar plants |
| 6 | Midterm Examination 1 |
| 7 | Breeding methods of starch and sugar plants |
| 8 | Advanced potato breeding |
| 9 | Advanced potato breeding |
| 10 | Advanced potato breeding |
| 11 | Midterm Examination 2 |
| 12 | Advanced sugar beet breeding |
| 13 | Advanced sugar beet breeding |
| 14 | Advanced sugar beet breeding |
| 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 :** | 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** | 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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504212603 | **TITLE** | Physiological Appplications in Cereal Breeding |

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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** | | | | | Breeding-physiology relationship, assessing of genetic resources in yield improvement, genetic bases of physiological traits, analysis of breeding applications, recent physiological approaches in determination of yield, possibilities of yield improvement under dry conditions, tolerance for salt, cold, heat and waterlogging, selections in increasing of adaptation and yield, acid soils and aluminium toxicity, nitrogen, phosphorus and zinc use efficiency and genetic traits in their deficiencies are introduced | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The main aim of the course is to provide knowledge and ability to find scientific and practical solution to problems at physiological appplications in cereal breeding | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | - | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1.Know the basis physiology in breeding.  2.Know the morphological and physiological proporties of cereals.  3.Know the basis physiology in breeding  4. Know practises the basis physiology in breeding | | | | | | | |
| **TEXTBOOK** | | | | | 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** | | | | | Reynolds, M.P., Ortiz-Monasterio, J.I., McNab, A., 2001. Application of Physiology in Wheat. Mexico, D.F. CIMMYT, 240 p | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Breeding-physiology relationship |
| 2 | Assessing of genetic resources in yield improvement |
| 3 | Genetic bases of physiological traits |
| 4 | Analysis of breeding applications |
| 5 | Recent physiological approaches in determination of yield |
| 6 | Midterm Examination 1 |
| 7 | Possibilities of yield improvement under dry conditions |
| 8 | Tolerance for salt |
| 9 | Tolerance for cold |
| 10 | Tolerance for heat |
| 11 | Midterm Examination 2 |
| 12 | Tolerance for waterlogging |
| 13 | Selections in increasing of adaptation and yield |
| 14 | Acid soils and aluminium toxicity,Nitrogen, phosphorus and zinc use efficiency and genetic traits in their deficiencies |
| 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 (√)]** | | | | | | |
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| **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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504202515 | **TITLE** | Plant Cytogenetic Methods |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 (√)]** | | | | | | |
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| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | | | **Evaluation Type** | | | | | **Number** | | **Contribution**  **( % )** |
| Midterm | | | | |  | | 30 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | | 20 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | The methods used to observe plant chromosomes | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Better understanding of plant chromosomes and determine to its properties a more thorough will have with this course. In addition, techniques to obtain information about the number and morphology of plant chromosomes and use of these techniques in the process of breeding will teach at this course | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | This course will be taught to prepare of dye and using microscope for observe plant chromosomes. In addition, it will be given information about how to evaluate chromosomes as a morphologically | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Knowledge of the basic elements of heredity  2. Make to chromosome observations  3. Live life to explain the importance mitosis and meiosis  4. Discover and use a biological microscope | | | | | | | |
| **TEXTBOOK** | | | | | 1. Şehirali, S. ve M. Özgen, 2006. “Bitki Islahı” Ders Kitabı, A.Ü. Ziraat Fakültesi Yayınları, Anakara Üniversitesi Matbaası, Ankara.2. Singh, Ram J. Plant Cytogenetics, CRC Press. Boca Raton London New York Washington, D.C | | | | | | | |
| **OTHER REFERENCES** | | | | | 1. Elçi, Ş. 1994. Sitogenetikte araştırma yöntemleri ve gözlemler, YYÜ Yayınları2. Sybenga, J. 1992. Cytogenetics in plant breeding. Springer-Verlag | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Concepts of genetic and cytogenetic |
| 2 | Chromosomes, genes and DNA structure |
| 3 | Mitosis |
| 4 | Meiosis |
| 5 | Equipment and tools required for chromosome observations |
| 6 | Midterm Examination 1 |
| 7 | The methods used for the observation of somatic chromosomes |
| 8 | Squashing techniques and observations |
| 9 | Continuous construction preparates |
| 10 | Karyotype analysis and a detailed examination of the chromosomes |
| 11 | Midterm Examination 2 |
| 12 | Polyploidy |
| 13 | Mutations |
| 14 | Molecular cytogenetic methods |
| 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 :** | 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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504202513 | **TITLE** | Advenced breeding of forage crops |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Genetic and breeding of the most cultivated legumes and graminous forage crops | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The aim of this course gives information about genetic, cytogenetic and breeding of important forage crops in Turkey and worlwide. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Students taught in undergraduate genetics, cytogenetics and plant breeding courses will have the opportunity to practice on forage crops | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Knowledge about genetic and stogenetic of forages Knowledge about the genetics of forage crops  2. Students learn most commenly used methods for forages breeding Students learn the most commonly used methods for forage crops breeding  3. These methods can be applied in forages breeding  4. Learning can transfer the aplication for commercial purposes Learning can transfer the application for commercial purposes | | | | | | | |
| **TEXTBOOK** | | | | | 1. Genetic resources, chromosome engineering, and crop improvement: Forage Crops (Ram J. Singh)2. Hand book of plant breeding: Fodder Crops and Amenity Grasses (Beat Boller Ulrich K. Posselt Fabio Veronesi Editors) | | | | | | | |
| **OTHER REFERENCES** | | | | | 1. Şehirali, S. ve M. Özgen, 2006. “Bitki Islahı” Ders Kitabı, A.Ü. Ziraat Fakültesi Yayınları, Anakara Üniversitesi Matbaası, Ankara. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction |
| 2 | Plant breeding methods |
| 3 | Breeding methods of self pollinated forages 1 |
| 4 | Breeding methods of self pollinated forages 2 |
| 5 | Breeding methods of cross pollinated forages 1 |
| 6 | Midterm Examination 1 |
| 7 | Breeding methods of cross pollinated forages 2 |
| 8 | Alfalfa genetics and breeding |
| 9 | Sainfoin genetics and breeding |
| 10 | Clover genetics and breeding |
| 11 | Midterm Examination 2 |
| 12 | Birdsfoot Trefoil genetics and breeding |
| 13 | Ryegrass genetics and breeding |
| 14 | Wheatgrass genetics and breeding |
| 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 :** | 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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504202511 | **TITLE** | SEED PHYSIOLOGY |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Plant production methods, seed development and seed morphology, seed physiology and dormancy, seed viability and vigour tests, seed drying and storage, reasons of seed viability loss will be investigated in this course | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To teach seed development, morphology, physiology and biochemistry  To teach seed cleaning, drying and storage  To give information about seed germination and emergence  To teach nutrients stored in seed and mobilization of the nutrients in seeds | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To learn the seed and seed material in field crops and the standarts in both national and international  Training the agricultural engineers specialized in seed sectors | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Examine the seeds being the basis of plant production within all aspects  To have information about the national and international rules of seed testing  To knowledge and experience about identifying problems and solutions encountered in the seed  Meet the needs of organizations and institutions engaged in the specialized engineer on seed  Informing the changing and developing standards of seed testing rules and gain the ability to apply lifelong | | | | | | | |
| **TEXTBOOK** | | | | | Şehirali, S. 1997. Tohumluk ve Teknolojisi., Fakülteler Matbaası, İstanbul, Türkiye 422 s.Sağsöz, S. 1995. Tohumluk Bilimi, Atatürk Üniversitesi Yayınları No:677. 299 s.Bryant, J.A. 1985. Seed Physiology., Edward Arnold Pty. Ltd., London, 71 p.Bradford, K.J. and Nonogaki, H. 2007. Seed Development, Dormacy and Germination., Blackwell Publishing Ltd. Oxford, UK., 367 p | | | | | | | |
| **OTHER REFERENCES** | | | | | Kacar, B., Katkat, A.V. ve Öztürk, Ş. 2006. Bitki Fizyolojisi., Nobel Yayınları, Ankara, 563 s. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Definition of seed and seed material |
| 2 | Situation of seed production in Turkey and problems and reasons |
| 3 | Plant reproductive methods |
| 4 | Seed development in the plants |
| 5 | Germination and viability in seeds |
| 6 | Midterm Examination 1 |
| 7 | Biochemical changing during seed germination |
| 8 | Viability and vigour tests |
| 9 | Viability and vigour tests |
| 10 | Dormancy |
| 11 | Midterm Examination 2 |
| 12 | Seed cleaning and drying |
| 13 | Seed storage |
| 14 | Factors affecting seed viability |
| 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 :** | Assoc.Prof. M. Demir KAYA | **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** | 504201518 | **TITLE** | COMPUTER BASED ANALYSIS OF FIELD EXPERIMENT RESULTS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | 20 |
| Quiz | | | | |  | |  |
| Homework | | | | | 1 | | 30 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Experimental designs used in field experiments, completely randomized design, randomized completely block design, correlation analysis, regression analysis and analyzing statistical data in computer based statistical programs. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | MSc and PhD students learn the experimental designs to be used in field trials and their analysis using computer based statistical programs | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | It contributes to planning of field experiment in field crops, determination of the most suitable methods for evaluation and interpretation of research results | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | The student taken this course learns  Basic statistical concept  Understand experimental designs, observation and measurements in field trials.  Variance analysis,  Randomized plots and randomized block design  Correlation and regression analysis  Operate JUMP, SPSS and MSTAT-C statistic programs in computer | | | | | | | |
| **TEXTBOOK** | | | | | Yıldız, N. Ve H. Bircan 2003. Araştırma ve Deneme Metodları. Atatürk Üniv. Yay. No:67. 305s.Düzgüneş, O., T. Kesici ve F. Gürbüz. 1993. İstatistik Metotları. Ankara Üniv. Zir. Fak. Yayınları. 1291.218s. | | | | | | | |
| **OTHER REFERENCES** | | | | | GAlpaslan, M., A. Güneş ve A. İnal. 1998. Deneme Tekniği. Ankara Üniv. Zir. Fak. Yayın No: 1501. 437s.Yıldırım, M.B. ve Ş. Dere. 2005. Uygulamalı İstatistik. Ofis-Ser Matbaacılık Ltd. 120s. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Description, definition and contents of the course |
| 2 | Statistical programs used in field experiments |
| 3 | Data entering |
| 4 | Completely randomized design |
| 5 | Randomized complete block design |
| 6 | Midterm Examination 1 |
| 7 | MSTAT-C Statistic program |
| 8 | JUMP Statistic program |
| 9 | SPSS Statistic program |
| 10 | Grouping of means in relation to different comparison methods |
| 11 | Midterm Examination 2 |
| 12 | Preparation of results as table and graphics |
| 13 | Analysis of example research |
| 14 | Analysis of example research |
| 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 :** | Assoc.Prof. M. Demir KAYA | **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** | 504202512 | **TITLE** | SPECIFIC CULTIVATION AND BREEDING OF OILSEED CROPS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Teaching the specific cultivation and breeding techniques of mainly sunflower, soybean, safflower, rapeseed, sesame and groundnut plants | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To teach the specific cultivation techniques of oilseed crops  To teach the breeding methods of oilseed crops  To inform the vegetable oils and quality  To teach the cultivation of potential oilseed crops in Turkey | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | In particular specialization in breeding of oilseed crops and variety improvement | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Learns the specific cultivation techniques of oilseed crops  Learns the specific breeding methods of oilseed crops  Learns the variety improvement works of oilseed crops for breeding objectives  Transfers the knowledge obtained to practices  Developes the knowledge obtained and uses lifelong | | | | | | | |
| **TEXTBOOK** | | | | | Arıoğlu, H. 2000. Yağ Bitkileri Yetiştirme ve Islahı.Ç.Ü. Ziraat Fakültesi Yayınları, Genel yayın no: 220, 204 s.Weiss, E.A. 2000. Oilseed Crops, Blackwell Sci. Ltd., Victoria, Australia, pp.606. | | | | | | | |
| **OTHER REFERENCES** | | | | | Gürbüz, B., M.D. Kaya ve A. Demirtola. 2003. Ayçiçeği Tarımı, Hasad Yayıncılık, 100 s. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | The situation of oilseed crops in the world and Turkey |
| 2 | Taxonomy, morphology, flower structure, pollination biology of oilseed crops |
| 3 | Cultivation techniques in oilseed crops |
| 4 | Using areas of oilseed crops |
| 5 | Crossing techniques |
| 6 | Midterm Examination 1 |
| 7 | Heredity of yield components |
| 8 | Breeding objectives |
| 9 | Breeding methods in sunflower |
| 10 | Soybean breeding |
| 11 | Midterm Examination 2 |
| 12 | Safflower breeding |
| 13 | Rapeseed breeding |
| 14 | Sesame and groudnut breeding |
| 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 :** | Assoc.Prof. M. Demir KAYA | **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** | 504201513 | **TITLE** | INDUSTRIAL CROPS FOR BIOFUELS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Cultivation, breeding and biofuel production Technologies of oilseed crops like sunflower, safflower, rapeseed, soybean as a source of biodiesel and sugar beet, maize and sorghum for bioethanol production | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The importance of industrial crops for renewable energy sources, plants produced biodiesel and bioethanol and technologies | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Learning the usage of industrial crops for energy sources except for main production purposes | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Learns the cultivation and breeding of the plants produced biodiesel and bioethanol  Knowledge the renewable energy sources  Learns and uses the new technologies | | | | | | | |
| **TEXTBOOK** | | | | | Onurbaş Avcıoğlu, A., Türker, U., Atasoy, Z.D. Koçtürk, D. 2011. Tarımsal Kökenli Yenilenebilir Enerjiler Biyoyakıtlar. Nobel Yayıncılık, 492s | | | | | | | |
| **OTHER REFERENCES** | | | | | Öğüt, H., Oğuz H. 2006. Biyodizel. Nobel yayıncılık, 190s | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | The situation of oilseed crops in the world and Turkey |
| 2 | Production, situation and potential of Biodiesel in the world and Turkey |
| 3 | Vegetable oils, structure and biosynthesis |
| 4 | Cultivation and oils of rapeseed, soybean, safflower as biodiesel raw material |
| 5 | Cultivation and oils of sunflower, cotton seed and alternative oils |
| 6 | Midterm Examination 1 |
| 7 | Production of biodiesel, facilities and environmental impacts |
| 8 | Areas of usages of bioethanol |
| 9 | Production, situation and potential of Bioethanol in the world and Turkey |
| 10 | Sugar beet |
| 11 | Midterm Examination 2 |
| 12 | Maize and Sorghum |
| 13 | Wheat and potato |
| 14 | Production method of bioethanol |
| 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 :** | Assoc.Prof. M. Demir KAYA | **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** | 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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504202508 | **TITLE** | Winter Cereals Breeding |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | | - | 0 | | | 3 | 4 | COMPULSORY  ( x ) | | ELECTIVE  (   ) |  |
| **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 (     ) | | | | |  | | 25 |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Fundamentals of plant breeding and methodology | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Goals of plant breeding, techniques to rich to the targets. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Selection of proper genus and variety of cereals for region or location | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1.Proper methods selection for variety improvement  2.Gen source development and use  3.Proper selection  4.Performence evaluation | | | | | | | |
| **TEXTBOOK** | | | | | Şehirali, S., M.Özgen. 2002. Bitki Islahı, Ankara Üniversitesi Yy. No: 1527, Ders kitabı: 480, Ankara, 261 s.Kün, E. 1983. Serin İklim Tahılları. AÜZF. Yy: 875, ders kitabı: 240, Ankara, 307 s. | | | | | | | |
| **OTHER REFERENCES** | | | | | Yürür, N. 1994. Serin İklim Tahılları ( Tahıllar – I). Uludağ Üniversitesi basımevi, 250 s. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Goals of winter cereals breeding |
| 2 | technical of plant breeding |
| 3 | Characteristics of winter cereals,growing techniques |
| 4 | structure of grain,climatic and soil requirenment, |
| 5 | vejetative development, |
| 6 | Midterm Examination 1 |
| 7 | flowering,heading, |
| 8 | grain filling,ripening, |
| 9 | quality factors, |
| 10 | cultural methods, |
| 11 | Midterm Examination 2 |
| 12 | diseases and insects |
| 13 | proper methods selection for variety improvement |
| 14 | methods of harvest and storage |
| 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 :** | Doç. Dr. Murat Olgun | **Date:** | 7,05,2015 |

**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** | 504202509 | **TITLE** | Summer Cereals Breeding |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | | - | 0 | | | 3 | 4 | COMPULSORY  ( x ) | | ELECTIVE  (   ) |  |
| **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** | | | | | Importance of summer cereals for feding man and animals. Its morphology, development stages, quality factors, breeding methodology, diseases and insects. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | General characteristics and growing | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Selection of proper genus and variety of summer cereals for region or location | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1.Proper methods selection for variety improvement  2.Gen source development and use  3.Proper selection  4.Performence evaluation. | | | | | | | |
| **TEXTBOOK** | | | | | Şehirali, S., M.Özgen. 2002. Bitki Islahı, Ankara Üniversitesi Yy. No: 1527, Ders kitabı: 480, Ankara, 261 s.Kün, E. 1985. Sıcak İklim Tahılları. AÜZF Yy: 953, Ders kitabı: 275, Ankara, 317 s. | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Goals of summer cereals breeding |
| 2 | Growing techniques |
| 3 | Structure of grain,climatic and soil requirenment, |
| 4 | Vejetative development, flowering,heading, |
| 5 | Quality factors, |
| 6 | Midterm Examination 1 |
| 7 | Cultural methods, |
| 8 | Diseases and insects |
| 9 | Methods of harvest and storage |
| 10 | Genotype selection for region or location |
| 11 | Midterm Examination 2 |
| 12 | Crossing |
| 13 | Selection |
| 14 | Testing and analyzing methots |
| 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:** | 27.11.2015 |

**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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504202510 | **TITLE** | Quality in Cereals |

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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 (√)]** | | | | | | |
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| **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** | | | | | The importance of cereal quality, cereal quality criteria, quality tests on cereals, evaluation of quality criteria. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The main aim of the course is to teach students the importance of cereal quality, quality criteria, analysis and evaluation of quality | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To teach how to make researches on cereal technology | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1.Learn what quality means on cereals  2.Learn quality analysis on cereals  3. Design and conduct experiments as well as to analyze and interpret data.  4. Use techniques, skills, and modern tools necessary for practice in chemistry. Learn what quality means on cereals | | | | | | | |
| **TEXTBOOK** | | | | | Ünal Sezgin. Hububat Teknolojisi. Ders Kitabı | | | | | | | |
| **OTHER REFERENCES** | | | | | 1.Anonymous 1988. Wheat: Chemistry and Technology. Vol II. (Ed. Y. Pomeranz). ACCC USA. 562.2. Anonymous, 1988. Wheat: Chemistry and Technology. Vol I. (Ed. Y. Pomeranz). ACCC USA. 514.3. Anonymous, 1988. Durum Wheat: Chemistry and Technology. (Ed. G. Fabriani and C. Lintas) ACCC, USA, 332.4-. Türker İ. ve A. Canbaş. 2001. Malt ve Bira Teknolojisi. Ç.Ü. Zir. Fak. Genel Yy no: 4, Adana, 300. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Criteria of wheat quality |
| 2 | Nutritional quality of wheat and wheat foods |
| 3 | Bread industry and processes |
| 4 | Soft wheat products |
| 5 | Durum wheat products |
| 6 | Midterm Examination 1 |
| 7 | Corn dry milling: Processes, products and application |
| 8 | Wet milling: process and products |
| 9 | Corn sweeteners |
| 10 | Corn starch and modification and uses |
| 11 | Midterm Examination 2 |
| 12 | Sweet corn |
| 13 | Fermentation processes and products |
| 14 | Malting and brewingCriteria of wheat quality |
| 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:** | 27.11.2015 |

**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** | 504201507 | **TITLE** | Field Crops Physiology |

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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 | | | | |  | | 25 |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | | NONE | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | The goals of this course is to ensure field crop physiology | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The goals of this course is to ensure field crop physiology | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Basis of field crop physiology, criteria affecting plant growth, nature and morphology of plants in terms of physiology, tissue types, structure of cell, primer methabolic processes in plant, respiration, photosynthesis, dry matter production in cereals, potato, legumes, grasses sink source relationship. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1.Understanding of basis of physiology of field crops  2.Effect of physiological processes to plants | | | | | | | |
| **TEXTBOOK** | | | | | 1.Reynolds, M.P., Ortiz-Monasterio, J.I., McNab, A., 2001. Application of Physiology in Wheat. Mexico, D.F. CIMMYT, 240 p. 2.Salisbury, F.B., Ross, C.W., 1992. Plant Physiology. Wadsworth Pub. Co. Belmont, California, 682 p. 3.Heyne, E.S., 1987. Wheat and Wheat Improvement. Am. Soc. of Agr. Inc. Madison, Wisconsin, USA, 763 p. 4.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 | Basis of field crop physiology, |
| 2 | criteria affecting plant growth, |
| 3 | nature and morphology of plants in terms of physiology, |
| 4 | tissue types, |
| 5 | structure of cell, |
| 6 | Midterm Examination 1 |
| 7 | primer methabolic processes in plant, |
| 8 | respiration, |
| 9 | photosynthesis, |
| 10 | photosynthesis, |
| 11 | Midterm Examination 2 |
| 12 | dry matter production in cereals, potato, |
| 13 | dry matter production in legumes, grasses |
| 14 | sink source relationship |
| 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 :** | 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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504211607 | **TITLE** | BREEDING OF MEDICINAL AND AROMATIC PLANTS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Description of medicinal and aromatic plants, Flower structure and pollination biology of medicinal and aromatic plants, Breeding priorities and methods of medicinal and aromatic plants, Breeding methods in Mint, thyme, melissa, oil sage, rosemary, black cumin, fenugreek and fennel. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The increasing use of healthy diet and environmental awareness, to teach breeding methods of medicinal and aromatic plants are aimed | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Training of persons for cultivation and breeding of medicinal and aromatic plants | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Training of persons for cultivation and breeding of medicinal and aromatic plants | | | | | | | |
| **TEXTBOOK** | | | | | Baytop, T. 1999, Türkiye’de bitkiler ile tedavi (Geçmişte ve Bugün), Nobel tıp kitap evleri, 2. Baskı, ISBN: 975-420-021-1. | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Description of medicinal and aromatic plants |
| 2 | Flower structure and pollination biology of medicinal and aromatic plants |
| 3 | Breeding priorities and methods of medicinal and aromatic plants |
| 4 | Breeding priorities and methods of medicinal and aromatic plants |
| 5 | Breeding methods in Mint |
| 6 | Midterm Examination 1 |
| 7 | Breeding methods in Thyme |
| 8 | Breeding methods in Lemon balm |
| 9 | Breeding methods in Sage |
| 10 | Breeding methods in Rosemary |
| 11 | Midterm Examination 2 |
| 12 | Breeding methods in Black cumin |
| 13 | Breeding methods in Fenugreek |
| 14 | Breeding methods in Fennel |
| 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 :** | 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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** | 504202516 | **TITLE** | GENETICS AND CYTOGENETICS OF OIL CROPS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | It is important that having knowledge of genetics and cytogenetics of oil crops in terms of developing novel cultivars, having high yield and quality, resistant to biotic and abiotic stress factors. It is aimed to give special information about genetics and cytogenetics of some important oil crops will be given. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To give imformation about genetics and cytogenetics of oil crops. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To know genetics and cytogenetics of oil crops and to have information about the contribution of these to breeding | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | - To learn the importance of genetics and cytogenetics of oil crops.  - To give imformation about applicability of genetics and cytogenetics of oil crops. | | | | | | | |
| **TEXTBOOK** | | | | | Arıcıoğlu, H., 2007, Yağ Bitkileri be Islahı, Çukurova Üniv., Ziraat Fak. Yay. 204 s. | | | | | | | |
| **OTHER REFERENCES** | | | | | Tugay, M.E., 1997, Özel Bitki Islahı, GOPU, Ziraat Fak.Yay. 162 s. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Genetics and cytogenetics of oil crops. |
| 2 | Genetics and cytogenetics of oil crops. |
| 3 | Genetics and cytogenetics of oil crops. |
| 4 | Genetics and cytogenetics of soybean |
| 5 | Genetics and cytogenetics of soybean |
| 6 | Midterm Examination 1 |
| 7 | Genetics and cytogenetics of peanut. |
| 8 | Genetics and cytogenetics of peanut. |
| 9 | Genetics and cytogenetics of sesame. |
| 10 | Genetics and cytogenetics of sesame. |
| 11 | Midterm Examination 2 |
| 12 | Genetics and cytogenetics of sunflower. |
| 13 | Genetics and cytogenetics of sunflower. |
| 14 | The use of genetics and cytogenetics of oil crops in breeding. |
| 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 :** | 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** | 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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** |  | **TITLE** | Specific Growing Techiques and Breeding in Winter Cereals |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | | - | 0 | | | 3 | 4 | COMPULSORY  ( x ) | | ELECTIVE  (   ) |  |
| **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** | | | | | Characteristics of winter cereals,growing techniques.Course content;  Importance of cereals in feding people and animal,structure of grain,climatic and soil requirenment,vejetative development,flowering,heading,grain filling,ripening,quality factors, cultural methods,diseases and insects | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Importance of breeding objectives, ways to reach yield, quality and other targets. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Selection of proper genus and variety of winter cereals for region or location | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1- Selection of proper genus and variety of cereals for region or location.  2- Selection of proper growing and control techniques for variety.  3- Methods of resistance to stress conditions  4- Selection of appropriate genotypes | | | | | | | |
| **TEXTBOOK** | | | | | Anonymous, 1983. Crop Breeding. Ed. D.R. Wood, American Soc. of Agronomy Publishers, Madison, Wisconsin, USA, 294 p.Reynolds, M.P., Ortiz-Monasterio, J.I. and A. McNab.2001. Application of Physiology in Wheat Breeding. Mexico, D.F.:CIMMYT, 240 p.Yürür, N. 1994. Serin İklim Tahılları ( Tahıllar – I). Uludağ Üniversitesi basımevi, 250 s.Kün, E. 1996. Tahıllar-I (Serin İklim Tahılları), 3. Baskı, 322 s, Ankara.. | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to winter cereal |
| 2 | structure of grain,climatic and soil requirenment,vejetative development, |
| 3 | Adaptation And Morphology Of wheat |
| 4 | Adaptation And Morphology Of barley |
| 5 | Adaptation And Morphology Of rye |
| 6 | Midterm Examination 1 |
| 7 | Adaptation And Morphology Of oat |
| 8 | Adaptation And Morphology Of triticale |
| 9 | Methods of resistance to stress conditions |
| 10 | Development and characterization of gen sources |
| 11 | Midterm Examination 2 |
| 12 | Breeding methodology selection |
| 13 | Parent selection and combination |
| 14 | Selection, testing and analyzing. |
| 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** | **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** |  | **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 :** | | | Prof.Dr.Hürriyet Erşahan, Prof.Dr. Ece Turhan, Prof.Dr. Abdullah Alğın, Doç.Dr. Özlem Alpu, Doç.Dr. Fatih Çemrek | **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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** |  | **TITLE** | SUSTAINABLE AGRICULTURE |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | |  |  | | | 3 |  | COMPULSORY  (   ) | | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Sustainable agricultural systems, soil management, crop rotations, innovation production systems, management production | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Sustainable agricultural systems that are favorable human and environment efficiently using resorurces | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Sustainable agricultural systems and threathering factors using sustainable | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1.Effecting soil health and productivity  2. Sustainable agricultural systems  3. Improving agricultural systems and planning  4. Research using and relationships | | | | | | | |
| **TEXTBOOK** | | | | | Sustainable Agriculture Systems, Clive A. edwards, Rattan Lal, Patrick Madden, Robert H. Miller and Gar House, St Lucic Press. | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Historical perspective |
| 2 | Soil health |
| 3 | Crop rotation |
| 4 | Modern methods (Biotechnology etc.) |
| 5 | Planth health |
| 6 | Midterm Examination 1 |
| 7 | Soil tillage methods |
| 8 | Agriculture and animal relationships |
| 9 | Agriculture and water quality |
| 10 | Role of sustainable agriculture |
| 11 | Midterm Examination 2 |
| 12 | Machinary using |
| 13 | Input using |
| 14 | Future perspective |
| 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. Halil İbrahim ERKOVAN | **Date:** | 28.03.2017 |

**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** | Dry Farming Systems |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | 60 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 40 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Climate types of world, Climate types of Turkey, Field farming systems, Fallow in dry farming areas, Soil tillage, soil tillage in dry farming areas. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | it is aimed to increase the agricultural productivity with improving the plant production systems where precipitation is insufficient and irregular | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Know to dry farming system | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Know the climate types  2. Know the agricultural systems  3. Know the soil tillage  4. Know the soil tillage in dry farming areas | | | | | | | |
| **TEXTBOOK** | | | | | İşler, N. Kuru tarım. Mustafa Kemal Üniversitesi Ziraat Fakültesi Tarla Bitkileri Bölümü Ders Notları | | | | | | | |
| **OTHER REFERENCES** | | | | | Ceylan, A. 1994. Tarla tarımı. Ege Üniversitesi Ziraat Fakültesi Yayınları, İzmir. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Climate types of world |
| 2 | Climate types of world |
| 3 | Climate types of Turkey |
| 4 | Field farming systems |
| 5 | Fallow in dry farming areas |
| 6 | Midterm Examination 1 |
| 7 | Reduction of fallow areas |
| 8 | Soil squeze |
| 9 | Soil tillage |
| 10 | Soil tillage |
| 11 | Midterm Examination 2 |
| 12 | Tillage methods |
| 13 | Tillage methods |
| 14 | Soil tillage in dry farming areas |
| 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 :** | Assoc. Prof. Nihal KAYAN | **Date:** |  |

**Signature**:

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**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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** |  | **TITLE** | Rangeland Vegetetion survey and evaluation |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | |  |  | | | 3 |  | COMPULSORY  (   ) | | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | How do environmental factors impact where and what can be done for sustainable use. The combine effects should reveal with use of multivariate analysis | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Rangeland vegetation situation, affecting factors and their effects on vegetation and observe the changes they occur as a results | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | An alternative of univariate analysis for rangeland evaluated methods is multivariate analysis. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Please write minimum four learning outcomes for the course. | | | | | | | |
| **TEXTBOOK** | | | | | Range ManagementRangeland Improving | | | | | | | |
| **OTHER REFERENCES** | | | | | Meadow and Rangeland Application books | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Structure of rangeland vegetation and description |
| 2 | Rangeland vegetation types |
| 3 | qualitative and quantitative features of rangelands |
| 4 | Production and research methods |
| 5 | Grazing methods |
| 6 | Midterm Examination 1 |
| 7 | Rangeland vegetation survey and choosing methods |
| 8 | Range vegetation survey |
| 9 | Range vegetation survey |
| 10 | Data analyses (Univariate) |
| 11 | Midterm Examination 2 |
| 12 | Data analyses (Univariate) |
| 13 | Data analyses (Multivariate) |
| 14 | Data analyses (Multivariate) |
| 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. Halil İbrahim ERKOVAN | **Date:** | 01.11.2017 |

**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** | Use of Microorganisms in Field Crops |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | 60 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 40 |
| **PREREQUISITE(S)** | | | | | None | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | The importance of microbial fertilizers, biopesticide and  biyoinsentisit, bioherbicide, use of biofertilizer in agricultural ecosystems, nitrogen fixation, PGPR effects on plant development,  phosphate solubility,biological nitrogen fixation | | | | | | | |
| **COURSE OBJECTIVES** | | | | | It is aimed to benefits, principles and techniques of the use of bacteria to PGPR in agriculture. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Know to biofertilizers | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Know the importance of microbial fertilizers  2. Know the nitrogen fixation  3.Know the effects of PGPR  4.Know the phosphate solubility | | | | | | | |
| **TEXTBOOK** | | | | | Çakmakçı, R., Erdoğan, Ü.G., 2008. Bitkisel Üretimde Mikroorganizma Kullanımı, Organik Tarım,(2. baskı), Atatürk Üniv. Ziraat Fakültesi Ders Yayınları No 236. Atatürk Üniv Ziraat Fakültesi Ofset Tesisi, Erzurum. | | | | | | | |
| **OTHER REFERENCES** | | | | | İşler, N. Azot döngüzü ve azot fiksasyonu, Mustafa kemal Üniversitesi, Ziraat fakültesi Tarla Bitkileri Bölümü Ders Notları. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | The importance of microbial fertilizers |
| 2 | Bioopeptidic, bioinsecticide and bioherbicides |
| 3 | Use of biofertilizers in agricultural ecosystems |
| 4 | Nitrogen fixation |
| 5 | Nitrogen fixation |
| 6 | Midterm Examination 1 |
| 7 | The effects of PGPR on plant development |
| 8 | The effects of PGPR on plant development |
| 9 | Phosphate solubility |
| 10 | Enzyme Activity |
| 11 | Midterm Examination 2 |
| 12 | Antagonistic and synergistic effect |
| 13 | Heavy metal remove |
| 14 | Microorganism and Water Use |
| 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 :** | Assoc. Prof. Nihal KAYAN | **Date:** |  |

**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** | Adaptation Mechanisms to Abiotic Stress in Plants |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | The responses of plants to environmental stresses and their adaptation mechanisms, the role of organic osmolytes, growth regulators, antioxidants and plant nutrients in this adaptation, and gene expressions in abiotic stresses will be discussed. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | It is aimed to provide an understanding of the physiological and molecular mechanisms that plants create to ensure their survival with various and changing environmental stimuli. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | The information to be obtained in the course will be useful for creating appropriate strategies to counter abiotic stresses. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Understanding stress physiology and molecular mechanisms in plants  2. Gaining the ability to learn the types of stress that plants are exposed to and to develop strategies that can be applied to cope with them.  3. Gaining the ability to determine the appropriate material and method for the effective recognition of the environment related to the application area  4. Gaining the ability to take responsibility individually and work with disciplined teams  5. Gaining awareness of professional and ethical responsibility  6. Gaining the awareness and skills to prioritize the protection of the environment and biological diversity, to inform and warn the society on these issues  7. 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** | | | | | Abiotic Stress Responses in Plants: Metabolism, Productivity and Sustainability, 2012, Edited by Parvaiz Ahmad, M.N.V. Prasad | | | | | | | |
| **OTHER REFERENCES** | | | | | 1. Plant Adaptation Strategies in Changing Environment, 2017, Edited by Vertika Shukla, Sanjeev Kumar, Narendra Kumar2. Plant Abiotic Stress Tolerance: Agronomic, molecular and biotechnological approches, 2019, Edited by Mirza Hasanuzzaman, Khalid Rehman Hakeem, Kamrun Nahar, Hesham F. Alharby | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Abiotic Stress Responses in Plants |
| 2 | Morphological and Anatomical Changes Related to Abiotic Stress in Plants |
| 3 | Changes in Plant Metabolism as an Abiotic Stress Response |
| 4 | Plant Growth in Stress Conditions |
| 5 | Stress-Induced Flowering |
| 6 | Antioxidative Defense Mechanisms |
| 7 | Gene Expressions in Abiotic Stress |
| 8 | MidTerm Exam |
| 9 | Water Consumption of Plants During Abiotic Stress |
| 10 | Uptake of Mineral Elements During Abiotic Stress |
| 11 | The Effect of Micronutrient Deficiencies on the Stress Responses of Plants |
| 12 | Effects of Soil Organic Matter or Applied Organic Fertilizers on Adaptation to Stress |
| 13 | Salicylic Acid, Nitric Oxide etc. Role of Applications in Adaptation to Stress |
| 14 | The Role of Arbuscular Mycorrhizal Symbiosis and PGPR Applications in Environmental Stress |
| 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 :** | 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 (MSc)** | **SEMESTER** |  |

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| **COURSE** | | | |
| **CODE** |  | **TITLE** | SPICE PLANTS AND BREEDING |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | | 1 | | 20 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 40 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | The breeding, definition, cultivation and using areas of the spice plants which have economically important in Turkey and in the world. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | The definition, trading values, spice production of Turkey and the world will be teached the spices and spice plants which have been important during the world history. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | The students search the ways to develop of the spice trade and the aims of the breeding. They learn the spices that address to world trade and are used at different sectors. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | They recognize the economical importance having spice plants.  They learn the cultivation and trading values of these plants.  They realize the importance of the breeding studies on spice plants.  They learn the alternate ways of using technology. | | | | | | | |
| **TEXTBOOK** | | | | | Tobacco, Medicinal and Spice Plants | | | | | | | |
| **OTHER REFERENCES** | | | | | Food Plants, Krauter | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | The spice definition and classification |
| 2 | Refined and unrefined spices |
| 3 | The trade and advantages of refined and unrefined spices |
| 4 | The general definition of the spice plants cultivated in turkey |
| 5 | The general definition of the spice plants not cultivated but traded in Turkey |
| 6 | The cultivation, breeding and trade of red pepper and fenugreek |
| 7 | The cultivation, breeding and trade of thymes, oregano etc. |
| 8 | The cultivation, breeding and trade of caper, dill and basil |
| 9 | The cultivation, breeding and trade of fennel, anise and chervil |
| 10 | The cultivation, breeding and trade of cumin, coriander and tarragon |
| 11 | The cultivation, breeding and trade of garlic and onion |
| 12 | The cultivation, breeding and trade of minth and laurel |
| 13 | The cultivation and trade of ginder, turmeric, cardamom and galangal |
| 14 | The cultivation and trade of clove, cinnamon, allspice, black pepper and vanilla |
| 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. Ahmet GÜMÜŞÇÜ | **Date:** | 16.11.2020 |

**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** | MEDICINAL AND AROMATIC GEOPHYTES |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | 20 |
| Quiz | | | | |  | |  |
| Homework | | | | | 1 | | 30 |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Introducing bulbous, tuberous and rhizomatous plants  Emphasizing medicinal and aromatic properties of geophytes | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Multipurpose using of geophytes, their production and evaluation  Emphasizing medicinal and aromatic properties of these plants | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | The students will enhance themselves knowledge of these plants production which are different in terms of anatomic and propagation. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | To learn the plant goups that have different production techniques and propagation abilities. Farklı vejetasyon dönemlerinde -özellikle üretim sezonu dışında- üretim alanlarını değerlendirecek alternatif bitki gruplarını öğrenirler. | | | | | | | |
| **TEXTBOOK** | | | | |  | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 |  |
| 2 |  |
| 3 |  |
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| 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. 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 (MSc)** | **SEMESTER** |  |

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

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | | 0 | 0 | | | 3 | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| 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 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 :** | Assoc. Prof. Dr. İmren Kutlu | **Date:** | 15.11.2021 |

**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** | CLİMATE CHANGE and CROP PRODUCTİVİTY |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | |  |  | | | 3 |  | COMPULSORY  ( X ) | | ELECTIVE  (   ) | Türkçe |
| **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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Reason for global warming, effects on climate changes and its contribution to climate changes and effect of climate change on crop production | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To improve of the effect of climate change and adapting and developing new strategies on agriculture | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | |  | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Undertandig climate change  Effect of climate changes on planth growth  Effect of climate change on natural researchs  Climate changes and future strategies | | | | | | | |
| **TEXTBOOK** | | | | | Bhattacharya, A., 2019. Changing Climate and Resourch Use Efficiency in Plants. Academic Press. London, 314 p. | | | | | | | |
| **OTHER REFERENCES** | | | | | Reddy, K.R. and Hodges, H.F. 2000. Climate Change and Global Crop Productivity. CABİ Publ., Oxon, 472 p. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Global climate change and impacting factors |
| 2 | The effcet of global climate change on agriculture crop response |
| 3 | Interactif effecting of carbon dioxide and climate changes |
| 4 | Climate changes resource use efficiency I |
| 5 | Climate changes resource use efficiency II |
| 6 | Climate change impact on water availability |
| 7 | Climate change and its effects on natural environment |
| 8 | Radiation use efficiency under different climate I |
| 9 | Radiation use efficiency under different climate II |
| 10 | Water use efficiency under different climate I |
| 11 | Water use efficiency under different climate II |
| 12 | Nitrogen use efficiency under climate changing |
| 13 | Phosphorus use efficiency under climate changing |
| 14 | Future strategies for climate changes |
| 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. Ali KOÇ | **Date:** |  |

**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** | FORAGE QUALITY AND THE AFFECTİNG FACTORS |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | |  |  | | | 3 |  | 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 | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | It is possible to increase the meat and milk yield in animal production in Turkey and in the world and to know the sources of roughage which constitute a significant part of the cost. The quality of the herbs in the forage plants and the effect of the environmental factors on the quality is one of the most important factors in improving the yield and quality in animal production. It is necessary to know the effect of feeding disorders caused by fodder crops on animals and the precautions to be taken. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To teach quality characteristics, quality factors, quality roughage production and evaluation in forage plants | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | The amount, quality and use of grass produced from roughage sources. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. Roughage sources  2. Factors affecting feed quality  3. Feed value of forage crops  4. To have information about animal feed preferences  5. Nutritional disorders caused by plant plantsForage sources | | | | | | | |
| **TEXTBOOK** | | | | | Açıkgöz, E., 2001. Forage Crops. Uludag University, Faculty of Agriculture, Bursa.Barnes et al. 2003. Forages I and II. Iowa State University Press. Ames, Iowa, USA. | | | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Quality concept and importance of forage crops cultivation |
| 2 | Chemical structure and function of forage crops |
| 3 | The effect of breeding technique on quality |
| 4 | Feed value of forage crops |
| 5 | Plant factors affecting the feed value of forage crops |
| 6 | Midterm Examination 1 |
| 7 | Environmental factors affecting the feed value of forage crops |
| 8 | Cultural factors affecting the feed value of forage crops |
| 9 | Classification of forage crops according to feed value |
| 10 | Flavoriness in fodder plants and factors affecting it |
| 11 | Midterm Examination 2 |
| 12 | Toxic substances and alkaloids, mineral substance poisoning and irregularities |
| 13 | Toxic substances and alkaloids, mineral substance poisoning and irregularities |
| 14 | Digestion rate and factors that affect it |
| 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 :** | Dr. Öğr. Üyesi Şule ERKOVAN | **Date:** |  |

**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** | SILAGE PLANT PRODUCTION AND TECHNOLOGY |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 3 | |  |  | | | 3 |  | 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 | | | | | 1 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Introduction, conservation forms of forage crops, silage concept, economic importance of corn, morphological features, adaptation, cultivation technique, diseases and pests, Sorghum, alfalfa, vetch, Hungarian vetch, pods, forage peas, rapeseed, forage turnip, sunflower, potato, sugar beet, advantages of silage, silos, silage making technique, silage fermentation periods, additives, feed value of silages | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Plant breeding and silage production techniques with the aim of silage increase the importance of roughage in our country. Therefore, the aim of this course is to provide the students with the necessary knowledge and skills in silage production and silage production techniques. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | Silage plant cultivation and silage technics | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Know and apply the techniques of silage production.  To be able to learn and synthesize the other plants used in silage production  Knows the importance of silage in terms of feeding value and animal feeding.  To comprehend silage production and quality evaluation.  Knows the importance of silage in terms of feeding value and animal feeding. | | | | | | | |
| **TEXTBOOK** | | | | | Açıkgöz, E., Turgut, İ., Filya İ., 2002. Silaj bitkileri yetiştirme ve silaj yapımı. HASAD Yayıncılık Ltd. Şti.Açıkgöz, E., 2001. Yem Bitkileri. Uludağ Üniversitesi Güçlendirme Vakfı Yayın No: 182. Bursa. 584s.Serin Y., Tan M.,2004. Buğdaygil Yem Bitkileri. Atatürk Üniversitesi Yayın No: 859. 232s. | | | | | | | |
| **OTHER REFERENCES** | | | | | Tan, M., Özdemir, H., Gül, İ., 2011. Silaj Çiftçi El Kitabı. Erzurum Ovasında Silaj Tekniğinin Yaygınlaştırılması Projesi, Kuzeydoğu Anadolu Kalkıonma Ajansı, Erzurum. 43 s. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction, scope of the course, reason, importance of silage in animal nutrition |
| 2 | Advantages of silage, silos, silage making technique |
| 3 | Silage fermentation periods |
| 4 | Silage additives |
| 5 | Feeding values of silages |
| 6 | Determination of silage quality |
| 7 | Midterm Examination 1 |
| 8 | Silage maize cultivation, diseases and pests, harvesting |
| 9 | Use of forage grasses in silage production |
| 10 | Use of forage legume in silage production |
| 11 | Midterm Examination 2 |
| 12 | Other plants for silage production |
| 13 | Other plants for silage production |
| 14 | Term project presentations |
| 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 :** | Dr. Öğr. Üyesi Şule ERKOVAN | **Date:** | 08.11.2019 |

**Signature**:

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**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** | Use of Biostimulators in Agriculture |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 2 | | 0 | 0 | | | 3 | 4 | COMPULSORY  ( x ) | | ELECTIVE  (   ) | Turkısh |
| **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 | | | | |  | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 50 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | The Importance of Bioactivators in Agriculture, Biostimulants and Plant Hormesis Management, The Effect of Applied Sedaxane Fungicide as a Bioactivator in Seeds, The Effect of Zinc Dissolving Bacteria on Growth in Plants, The Effects of Protein Hydrolysates on Biostimulant Effect, Plant Physiology and Its Effects on the Microbiome, Less on the Surface of the Plants Arbuscular Mycorrhizaes Increasing Strength, Physiological and Metabolic Reactions of Plants Against NaCl Stress with Application of Omeprazole, Genetic Characterization and Diversity of Rhizobium Bacteria in Root Nodosity in Plants | | | | | | | |
| **COURSE OBJECTIVES** | | | | | To provide students with knowledge about the use of bioactivators in agriculture | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To provide students with knowledge about bioactivators and their applications in agriculture | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Bioactivators in agriculture contain substance (s) and / or microorganisms, the function of which is to promote natural processes to increase nutrient intake, nutritional efficiency, tolerance to abiotic stress and crop quality, when applied to plants or rhizosphere. It is important to note that bioactivators only affect the viability of a plant and do not offer direct action against diseases, insects or weeds. | | | | | | | |
| **TEXTBOOK** | | | | | Biosrimulants in Agriculture, Edited by : Youssef Rouphael and Giuseppe Colla, Published in: Frontiers in Plant Science and Frontiers in Microbiology, March, 2020, 657 p. | | | | | | | |
| **OTHER REFERENCES** | | | | | BUDAK, F., 2011- Bazı bitki aktivatörlerinin buğdayda külleme ve pas hastalıklarina ve verime etkilerinin araştırılması, Y.Lis.Tezi, Namık Kemal Üniversitesi, Fen Bilimleri Enstitüsü, Bitki Koruma Anabilim Dalı,Tekirdağ, 37 s. | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | The Importance of Bioactivators in Agriculture |
| 2 | Plant Hormesis Management with Biostimulants of Biotic Origin in Agriculture |
| 3 | Effect of Applied Sedaxan Fungicide in Seeds as Bioactivator |
| 4 | The Effect of Zinc Dissolving Bacteria on Growth in Plants |
| 5 | Biostimulant Action of Protein Hydrolysates: Unraveling Their Effects on Plant Physiology and Microbiome |
| 6 | Arbuscular Mycorrhizaes that Reduce Surface Water Flow, Reduce Sweating and Increase Drought Resistance in Plants |
| 7 | Midterm Examination |
| 8 | Omeprazolün Uygulamasıyla Bitkilerin NaCl Stresine Karşı Gösterdiği Fizyolojik ve Metabolik Tepkiler |
| 9 | The Effect of Exogenously Applied Brassinosteroids on Fruit Yield |
| 10 | The Effect of Seaweed Extracts Obtained from Laminaria and Ascophyllum nodosum on Plant Growth |
| 11 | The Effect of Herbal Biopolymer Based Bioactivators on Plant Root Growth |
| 12 | Pyropia yezoensis'ten Elde edilen Düşük Moleküler Ağırlıklı Polisakkaritlerin Bitkilerin Tuz Stresine Toleransına Etkisi |
| 13 | Genetic Characterization and Diversity of Rhizobium Bacteria That Form Root Nodosity in Plants |
| 14 | Effect of Plant Source Protein Hydrolysates on Plant Yield and Metabolism as Bioactivators |
| 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:** | 8.05.2020 |

**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** | Use of Artificial Intelligence in Agriculture |

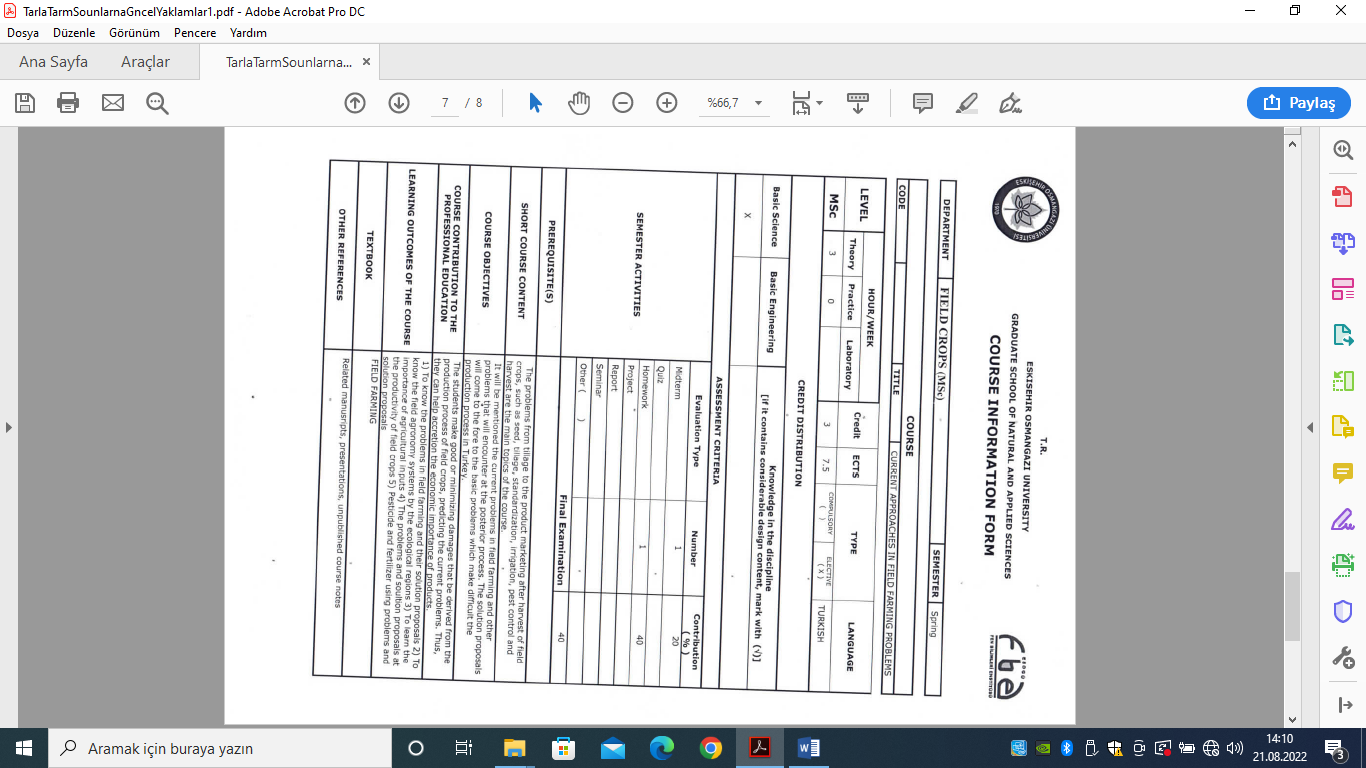
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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 2 | | 2 |  | | | 4 | 4 | COMPULSORY  ( X ) | | ELECTIVE  (   ) |  |
| **CREDIT DISTRIBUTION** | | | | | | | | | | | | |
| **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 | | | | |  | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | Introduction and Basic Principles, Usage of Artificial Intelligence in Different Fields, Introduction to Intelligent Factors, Artificial Intelligence Technologies, Consultant and Advisory Learning, Logical Operations, Artificial Neural Network and Applications, Fuzzy Logic and Applications, Sample Applications | | | | | | | |
| **COURSE OBJECTIVES** | | | | | Artificial intelligence methods in agriculture and their applications provide information about artificial intelligence in agricultural education | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | To make students aware of artificial intelligence methods and their applications in agriculture | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | Artificial intelligence is about imitating natural systems like humans and animals using human-made tools like computers and robots. This method involves understanding how information can be represented so that information, especially ambiguous information, can be stored in computer memory and automatically extracted from it. | | | | | | | |
| **TEXTBOOK** | | | | | Çetin ELMAS, Yapay Zeka Uygulamaları, 2. Basım, Seçkin Yayıncılık, Ankara, 2011. | | | | | | | |
| **OTHER REFERENCES** | | | | | Birol YILDIZ, Finansal Analizde Yapay Zeka, Detay Yayıncılık, 2009. Vasif V. NABIYEV, Yapay Zeka, Problemler - Yöntemler – Algoritmalar, 3. Basım, Seçkin Yayıncılık, Ankara, 2010. | | | | | | | |

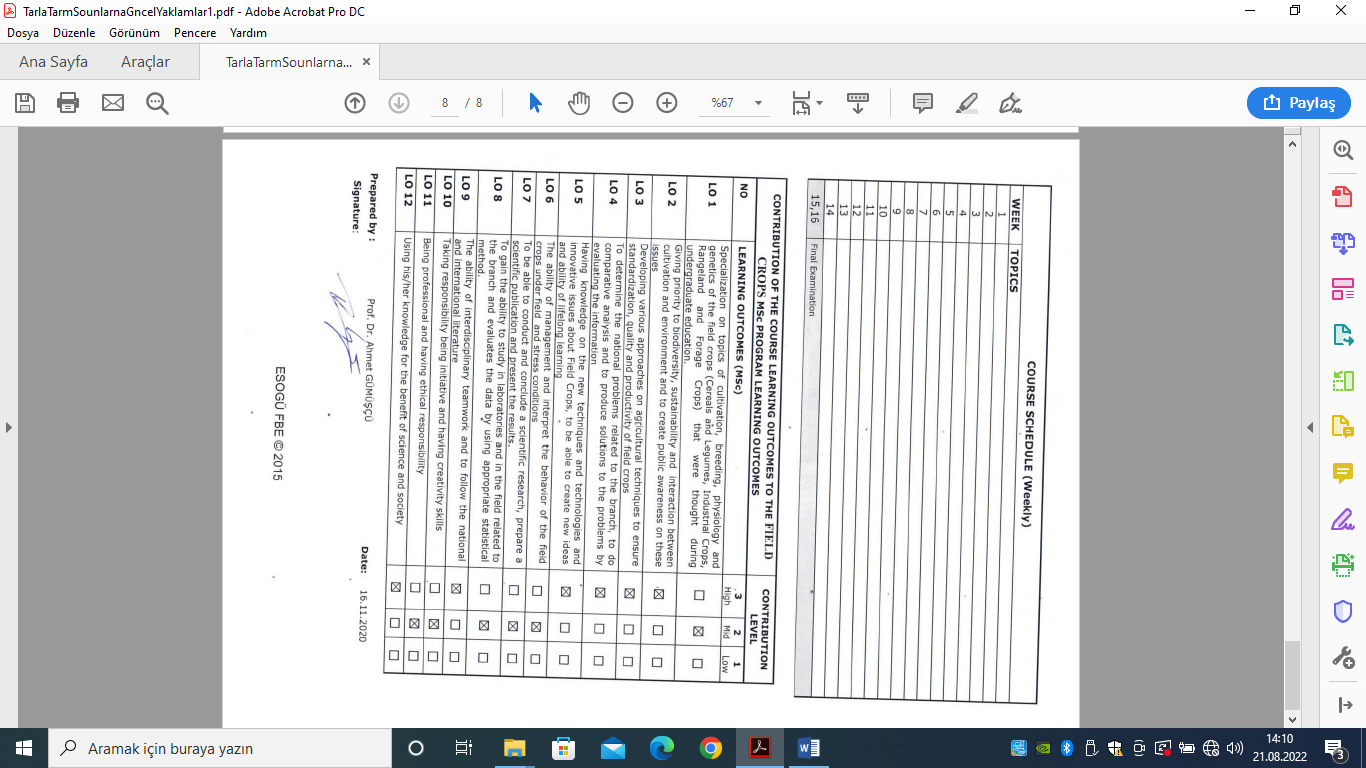
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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction and Basic Principles |
| 2 | Use of Artificial Intelligence in Different Fields |
| 3 | Introduction to Intelligent Factors |
| 4 | Artificial Intelligence Technologies |
| 5 | Supervised Learning |
| 6 | Logical Inference |
| 7 | MidTerm Examination |
| 8 | Unsupervised Learning |
| 9 | Introduction to Artificial Neural Networks |
| 10 | Artificial Neural Networks and Applications |
| 11 | Introduction to Fuzzy Logic |
| 12 | Applications of Fuzzy Logic in Agricultural Engineering |
| 13 | Fuzzy Logic Controller Mechanisms |
| 14 | Example applications |
| 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 |  |  |  |
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| **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 |  |  |  |
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| **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:** | 8.05.2020 |

**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** | 504202529 | **TITLE** | New Trends in Plant Breeding |

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| **LEVEL** | **HOUR/WEEK** | | | | | | **Credit** | **ECTS** | **TYPE** | | | **LANGUAGE** |
| **Theory** | | **Practice** | **Laboratory** | | |
| **MSc** | 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 | | | | | 0 | | 40 |
| Quiz | | | | |  | |  |
| Homework | | | | |  | |  |
| Project | | | | |  | |  |
| Report | | | | |  | |  |
| Seminar | | | | |  | |  |
| Other (     ) | | | | |  | |  |
| **Final Examination** | | | | | | | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | | | |
| **SHORT COURSE CONTENT** | | | | | It contains information on innovative techniques such as speed breeding, genome editing, advanced quantitative genetic technologies and data management used to supplement and complement traditional approaches such as doubled haploidy, embryo culture, marker assisted selection, genomic selection, high-data genotyping, high-data phenotyping, transgenic breeding. | | | | | | | |
| **COURSE OBJECTIVES** | | | | | It is aimed to provide information about modern tools and techniques to increase genetic gain rates and operational efficiency in plant breeding programs. | | | | | | | |
| **COURSE CONTRIBUTION TO THE PROFESSIONAL EDUCATION** | | | | | They will have experience in researching advanced techniques that can accelerate the distribution of new and innovative varieties for the benefit of breeders, producers, consumers and the environment, the application of breeding technology to improve plant performance and resistance, and the discovery of markers for key traits using plant populations, next-generation sequencing, bioinformatics and genetics. They will also have the opportunity to learn about new gene editing technologies that will revolutionize the plant breeding industry. | | | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | | | 1. To train trained researchers with advanced knowledge and skills in the use of new plant breeding tools and techniques, including approaches to testing, quality data generation, data management, and selection decisions.  2. Enabling plant breeders to adopt modern tools and techniques in plant breeding programs to generate improved germplasm.  3. Gain knowledge of various innovative methods/approaches and improvements made in the breeding of important agricultural products in the recent past  4. To learn the latest information about new innovative methods/technologies to accelerate plant breeding. | | | | | | | |
| **TEXTBOOK** | | | | | 1. Plant Breeding - New Perspectives, 2022, Edited by Haiping Wang, InTechOpen2. Accelerated Plant Breeding, 2020, Edited by Satbir Singh Gosal and Shabir Hussain Wani, Springer | | | | | | | |
| **OTHER REFERENCES** | | | | | 1. Next Generation Plant Breeding, 2018, Edited by Yelda zden Çiftçi, InTechOpen2. New Crop Breeding Technologies course notes | | | | | | | |

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| **COURSE SCHEDULE (Weekly)** | |
| **WEEK** | **TOPICS** |
| 1 | General Introduction of New Technologies in Plant Breeding |
| 2 | Modeling and Simulation of Plant Breeding Strategies |
| 3 | Speed Breeding Methods |
| 4 | Data-Driven Decisions for Accelerated Plant Breeding |
| 5 | Smart Breeding Methods |
| 6 | Genomic and Marker Assisted Selection in Plants |
| 7 | New Approaches in Plant Genotyping and Phenotyping |
| 8 | Mid-Term Exam |
| 9 | Advanced Quantitative Genetics Technologies for Accelerating Plant Breeding |
| 10 | Haploid Production Technologies in Plant Breeding: Androgenesis |
| 11 | Recent Advances in Chromosome Elimination Mediated Haploidy Breeding |
| 12 | Centromere Engineering for Haploid Plant Production |
| 13 | Role of Next Generation RNA-Seq Data in Plant Breeding |
| 14 | CRISPR/Cas9 System for Plant Breeding |
| 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. |  |  |  |
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| **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. |  |  |  |
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| **LO 12** | Using his/her knowledge for the benefit of science and society |  |  |  |

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| **Prepared by :** | Assoc. Prof. Dr. İmren Kutlu | **Date:** | 03.11.2022 |

**Signature**: