**The University of Jordan Department: Plant Protection**

**Faculty: Agriculture 2015-2016/ 1st Semester**

**Program: B.Sc. in Plant Protection**

**Fundamentals of Parasitic Flowering Plants (606331)**

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| --- | --- | --- | --- | --- | --- |
| Credit hours | 3 (2 LECTURES & 1 LAB) | Level | BSc.  | Pre-requisite | Biology 1 |
| Coordinator/ Lecturer | J. R. Qasem | Office number | 266 | Office phone | 22515 |
| Course website |  | E-mail | jrqasem@ju.edu.jo | Place | Faculty of Agriculture |

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| --- |
| Office hours |
| Day/Time | Sunday | Monday | Tuesday | Wednesday | Thursday |
|  | 10-12 | 10-12 | 9-11 | 10-12 | 11-1 |

**Course Description**

The course covers most problematic parasitic flowering plants and their distribution in the region, their impact on their hosts, specially on the strategic crops. means of management, with emphasis on parasitic plants in Jordan. The course includes conducting some laboratories, field study cases, literature surveys and presentation of research papers.

**Learning Objectives**

The underlying philosophy of this course is that parasitic flowering plants are diverse, and some are of economic importance in the world as well as in Jordan. The major objective of this course is to provide students with a strong knowledge about parasitic weeds in the following aspects

1- General categorization and identification of parasitic flowering plants (PFP)

2- Most important parasitic weeds (PW) in the world

3- Potential impact of PW on agriculture world wide

4- PW in Jordan, species, distribution, host range, and their impact

10- Management of PW

Intended Learning Outcomes:

A) Knowledge and Understanding( students should be able to )

 A1) identify PW

 A2) discuss information about the potential impact of PW

 A3) discuss/explain the essential concepts and major principles relevant to PW biology and physiology of parasitism

 A4) point out PW distribution in Jordan, and their management .

B) Intellectual Skills (Cognitive and Analytical)

 B1) use knowledge in identifying types of PW species in a specific area

 B2) employ skills acquired in managing PW

C) Subject Specific Skills

C1) Prepare and deliver well structured reports about PW and their possible management approaches in certain areas

C2) Be aware of the hazards of PW in various areas

D) Transferable Skills

D1) initialize and participate in establishing proper effective management of PW

D2) work effectively with farmers( subsistent, small or large) in minimizing the negative impact of PW

**Course Contents**

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| **Content** | **Reference** | **Week #** | **ILO/s** |
| Introduction to course contents, botanical affiliations of PFP and agronomic importance | 1, 2, 4 | 1 | A, B, C, D. |
| Distribution of parasitic weeds (PW) worldwide | 4, 5,  |  | A, B, C, D. |
| Parasitic plants impact in agriculture  | 1,3, 4,5 | 2 | A, B, C, D. |
| Biology of PFP in :a- Orobanchaceae | 3,4, 5 |  | A, B, C, D. |
| b- Cuscutaceae  | 1, 3, 4 | 3 | A, B, C, D. |
| c- Loranthaceae & Viscaceae | 1, 2, 4 |  | A, B, C, D. |
| d- Scrophulariaceae  | 1, 3, 4 | 4 | A, B, C, D. |
| e- Santalaceae | 1, 4 |  | A, B, C, D. |
| Host range & impact a- Orobanche, Cistanche  | 4, 6, 7 | 5 | A, B, C, D. |
| b- Host range & impact, Cuscuta sppmidterm | 4, 6, 7 | 6 | A, B, C, D. |
| c- Host range & impact striga | 1, 3, 4 | 7 | A, B, C, D. |
| d- Host range & impact Viscum, , Loranthus:  | 2, 4, 5 | 8 | A, B, C, D. |
| e- Host range & impact Cynomorium & Osyris spp. | 4 | 9 | A, B, C, D. |
| Methods of Orobanche managementCultural, chemical, physical and biological measurements | 4, 5, 9 | 10 | A, B, C, D. |
| Methods of Cuscuta managementCultural, chemical, physical and biological measurements | 4, 5, 9 | 11 | A, B, C, D. |
| Methods of Striga managementCultural, chemical, physical and biological measurements | 1, 4, 9 | 12 | A, B, C, D. |
| Methods of Orobanche managementCultural, chemical, physical and biological measurements | 3, 9 | 13 | A, B, C, D. |
| Possible methods of Viscum and Loranthus management Cultural, chemical, and biological measurements | 2, 4, 9 | 14 | A, B, C, D. |
| Other parasitic flowering plants in world agriculture | 4 | 15 | A, B, C, D. |
| Review  |  | 16 | A, B, C, D. |

Outline could be changed as the instructors sees necessary

**Laboratory outline**

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| **Week #** | **Activity** |
| 1 | Laboratory orientation and requirements |
| 2 | Introduction on parasitic weed collection & preparation |
| 3 | Slides show on parasitic weeds and problems in Jordan and the world |
| 4 | Parasitic weed structures: seeds, fruits, haustoria and succors, other modifications |
| 5 | Parasitic weeds with and without host stimulants. Preconditioning, epicotyl or germination tube structure, haustoria formation and attachment in Petri-dish |
| 6 | Parasitic weed germination and development |
| 7 | Glasshouse experiment on parasitic weed management: Orobanche & Cuscuta. |
| 8 | Parasitic weeds and hosts: Orobanchaceae, Orobanche spp. and Cistanche spp. |
| 9 | Parasitic weeds and hosts: Cuscutaceae, Cuscuta spp. |
| 10 | Parasitic weeds and hosts: Viscaceae (Viscum spp.) & Loranthaceae (Loranthus spp.) |
| 11 | Parasitic weeds and hosts: Santalaceae, Osyris & Thesium |
| 12 | Parasitic weeds and hosts: Cynomoriaceae, Cynomorium |
| 13 | Field trip to Jordan valley for Parasites (Loranthus, Viscum, Cuscuta, Orobanche) and their hosts |
| 14 | Field trip to high lands for parasites problems (Osyris, Viscum, Cynomorium, Cistanche, Orobanche, Cuscuta) and their hosts |
| 15 | Laboratory work finalization, reporting and evaluation |
| 16 | Final lab. Exam |

 **Learning Methodology**:

1) Duration: 16 weeks in second semester, 48 hours in total

3) Demos many-slide projections

3) Tutorial:…as needed…..

4) Laboratory: some lectures can be given in a form of laboratory projects

5) Case Study: each student must carry out a case study,

6) Assignments, Reports, Projects: reports on case studies, and presentations are required

**Evaluation**

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| --- | --- | --- |
| Evaluation | Point % | Date |
| Mid. Term Exam   | 30 | 7-8- weeks |
| Reports, and presentations, quizzes:  | 20 | as assigned by the instructor |
| Final Exam  | 50 | as assigned by the University registrar |

**Main Reference/s:**

1. Parker, C. and C. R. Riches. (1993). *Parasitic weeds of the world, biology and control*. CAB International. 332 pages. ISBN 0851988733
2. Qasem, J.R. (2006). Recent advances in parasitic weed research, an overview. In: *Weed Management Handbook*, 2006 pages 627-728 (H.P. Singh *et al*., eds.). ISBN -13: 978-1-56022-957-5, ISBN 1-56022-957-8. The Haworth Press Inc., USA.

**References:**

1. Musselman, L.J. (1987). Parasitic weeds in agriculture, Volume 1, Striga. CRC Press. 317 pages. ISBN 0849362725
2. Barlow, B.A. (1983). Biogeography of Loranthaceae and Viscaceae. In the Biology of Mistletoes, ed. , M. Calder. and P. Bernhardt. Academic Press, Sydney, pp. 19-46.
3. Joel, M.D., Gressel, J., and Musselman, L.J. (eds.). (2013). Parasitic Orobanchaceae. Parasitic mechanisms and control strategies. Springer, London.
4. Parker, C. and C. R. Riches. (1993). Parasitic weeds of the world, biology and control. Cab International. 332 pages. ISBN 0851988733
5. Press, M. and Graves, J. (eds.). (1996). Parasitic Plants. Chapman & Hall, New York.
6. Qasem, J.R. (2003). Weeds and their Control. University of Jordan, Amman, Jordan
7. Qasem, J.R. (2006). Recent advances in parasitic weed research, an overview. In: *Weed Management Handbook*, 2006 pages 627-728 (H.P. Singh *et al*., eds.). ISBN -13: 978-1-56022-957-5, ISBN 1-56022-957-8. The Haworth Press Inc., USA.
8. Qasem, J.R. (2006). Parasitic weeds and allelopathy, from the hypothesis to the proof. In: *Allelopathy*, *A Physiological Process with Ecological Implications*, 2006 page 565- 637 (Manuel J. Reigosa and Nuria Pedrol, and Luis Gonzalez eds.) ISBN-IO 1-4020-4279-5 (HB), ISBN-13 978-1-4020-4279-9 (HB), ISBN-IO 1-4020-4280-9 (e-book), ISBN-13 978-1-4020-4280-5 (e-book): Springer, The Netherlands.
9. Suerborne, Joachim.(1991). Parasitic flowering plants, ecology and management. Verlag Josef Margraf, . ISBN 3-8236-1217-4. 127 pages
10. Various proceedings of symposia, workshops and conferences on parasitic weeds
11. Websites to be announced during the course
12. Specialized journals, articles and research papers

**Intended Grading Scale (Optional)**

0-49 F

50-52 D-

53-55 D

56-58 D+

59-61 C-

62-64 C

65-67 C+

68-70 B-

71-73 B

74-76 B+

77-79 A-

80-100 A

**Notes:**

* Concerns or complaints should be expressed in the first instance to the module lecturer; if no resolution is forthcoming, then the issue should be brought to the attention of the module coordinator (for multiple sections) who will take the concerns to the module representative meeting. Thereafter, problems are dealt with by the Department Chair and if still unresolved the Dean and then ultimately the Vice President. For final complaints, there will be a committee to review grading the final exam.
* For more details on University regulations please visit:

 <http://www.ju.edu.jo/rules/index.htm>