



Course Specifications (Postgraduate Degree)

| | |
|----------------------|---|
| Course Title: | Plant and Animal Genetic Resources |
| Course Code: | BIOD 503 |
| Program: | M. Sc. Biodiversity |
| Department: | Biology |
| College: | Science |
| Institution: | University of Tabuk |

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A. Course Identification

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|---|
| 1. Credit hours: 3 Credit Hours (2 Theoretical + 1 Practical) |
| 2. Course type <input checked="" type="checkbox"/> Required <input type="checkbox"/> Elective |
| 3. Level/year at which this course is offered: Level 1/First year |
| 4. Pre-requisites for this course (if any): None |
| 5. Co-requisites for this course (if any): None |

6. Mode of Instruction (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|----|-----------------------|---------------|------------|
| 1 | Traditional classroom | 4 | 100 |
| 2 | Blended | | |
| 3 | E-learning | | |
| 4 | Distance learning | | |
| 5 | Other | | |

7. Actual Learning Hours (based on academic semester)

| No | Activity | Learning Hours |
|--------------|-------------------|----------------|
| 1 | Lecture | 26 |
| 2 | Laboratory/Studio | 26 |
| 3 | Seminars | |
| 4 | Others (specify) | |
| Total | | 52 |

B. Course Objectives and Learning Outcomes

1. Course Description:

- This course offers a review of key biodiversity problems in natural and agricultural habitats, genetic population structure, molecular markers of genetic diversity, and economic values of biodiversity. It describes the plant and animal genetic resources, their collection, exploration, ex-situ, and in-situ conservation, and utilization of genetic resources plant breeding. This course will cover the status of genetic remedies. Further, it describes genetic resources of aquatic, rhizospheric airborne microorganisms.

2. Course Main Objective

By the end of this course, the students should be able to:

- Describe the restoration and conservation of plant and animal genetic resources.
- Document the agrobiodiversity, biodiversity of plant and animal genetic resources. Describe strategies used in-situ and ex-situ conservation of genetic resources.
- Justify the reason for conserving the genetic resources of plants and animals.
- Determine the microbial genetic resources.

3. Course Learning Outcomes

| Course Learning Outcomes (CLOs) | | Aligned-PLOs* |
|---------------------------------|---|---------------|
| 1 | Knowledge and Understanding: | |
| 1.1 | Recognize the importance and utilization of plant and animal genetic resources. | K1 |
| 1.2 | Describe the role of microorganisms in different ecosystems and | K2 |

| Course Learning Outcomes (CLOs) | | Aligned-PLOs* |
|---------------------------------|---|---------------|
| | biogeochemical cycling. | |
| 1.3 | Describe interactions of microorganisms, plants, and animals. | K1 |
| 1.4 | List different strategies for the conservation of the genetic resource. | K1 |
| 1... | | |
| 2 | Skills: | |
| 2.1 | Evaluate conservation; preservation of plant genetic resources. | S2 |
| 2.2 | Plan the use of genetic resources in plant breeding and animal farming. | S3 |
| 2.3 | Choose the methods for assessment and conservation of plant, animal, and microbial genetic resources. | S3 |
| 2.4 | Evaluate, synthesize, and present scientific studies of genetic and functional microbial diversity in different ecosystems. | S3 |
| 2... | | |
| 3 | Values: | |
| 3.1 | Use statistical methods to analyze variability within and among genotypes and populations. | V3 |
| 3.2 | Evaluate the utilization of plant and animal genetic resources. | V1 |
| 3.3 | Apply different strategies for the conservation of agrobiodiversity, plant, animal, and microbial communities. | V3 |
| 3.4 | Use bioinformatics tools and databases to study diversity and conservation of genetic resources. | V3 |
| 3... | | |

* Program Learning Outcomes

C. Course Content

| No | List of Topics | Contact Hours |
|--------------|---|---------------|
| 1 | Introduction and aspects of diversification | 2 |
| 2 | Genetic resource, and principles of its conservation | 2 |
| 3 | Plant genetic resources for food and agriculture | 2 |
| 4 | Wild plant population and population genetics | 2 |
| 5 | Agricultural and horticultural genetic resources | 2 |
| 6 | Plant breeding- commercial crops and wild food plants | 2 |
| 7 | Forest genetic resources – DNA banking (Germplasm) | 2 |
| 8 | Animal genetic diversity - Animal genebank (Germplasm) | 2 |
| 9 | Developing a patent indicator for plant and animal genetic resources - species richness, dominant and rare species | 2 |
| 10 | Farming of plant and animal resources- Key technologies in animal breeding | 2 |
| 11 | Diversity of microbial resources (aquatic, rhizospheric, and airborne) | 2 |
| 12 | Genetic erosion- case studies of endemic, endangered, and extinct species | 2 |
| 13 | In situ conservation (Global biodiversity – Agrobiodiversity) and ex-situ conservation - Rationalization of ex-situ conservation | 2 |
| Total | | 26 |

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|------|--------------------------|---------------------|--------------------|
|------|--------------------------|---------------------|--------------------|

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|------------|---|---|---|
| 1.0 | Knowledge and Understanding: | | |
| 1.1 | Recognize the importance and utilization of plant and animal genetic resources. | <ul style="list-style-type: none"> - Lectures. - Group discussions. - Brainstorming. - Videos - Student's seminars. - Individual presentation. - Lab. demonstrations. - Field studies. | <ul style="list-style-type: none"> - Oral discussions. - Long and short essays. - Exams (Mid and Final) - Homework. - Quizzes. - Demonstrations. - Lab. reports. - Field reports. |
| 1.2 | Describe the role of microorganisms in different ecosystems and biogeochemical cycling. | | |
| 1.3 | Describe interactions of microorganisms, plants, and animals. | | |
| 1.4 | List different strategies for the conservation of the genetic resource. | | |
| 1. | | | |
| 2.0 | Skills: | | |
| 2.1 | Evaluate conservation; preservation of plant genetic resources. | <ul style="list-style-type: none"> - Lectures. - Group discussions. - Brainstorming. - Simulation. - Research paper-based learning. - The use of interactive video. - Lab. demonstrations. - Individual presentation. - Field studies. | <ul style="list-style-type: none"> - Peer assessment. - Self-evaluation. - Oral discussion. - Exams (Mid and Final) - Quizzes. - Individual and group presentations. - Lab. reports. - Field reports. |
| 2.2 | Plan the use of genetic resources in plant breeding and animal farming. | | |
| 2.3 | Choose the methods for assessment and conservation of plant, animal, and microbial genetic resources. | | |
| 2.4 | Evaluate, synthesize, and present scientific studies of genetic and functional microbial diversity in different ecosystems. | | |
| 2... | | | |
| | | | |
| 3.0 | Values: | | |
| 3.1 | Use statistical methods to analyze variability within and among genotypes and populations. | <ul style="list-style-type: none"> - Research activities. - Oral presentations. - An internet search, assignments, and essays. - Group discussion. - Case studies. - Individual, and group presentations. | <ul style="list-style-type: none"> - Student's essays and assignments. - Group reports. - Group presentations. - Discussion in lectures. - Student's written participation. - Analytical reports. - Lab. reports. - Case studies. - Posters. |
| 3.2 | Evaluate the utilization of plant and animal genetic resources. | | |
| 3.3 | Apply different strategies for the conservation of agrobiodiversity, plant, animal, and microbial communities. | | |
| 3.4 | Use bioinformatics tools and databases to study diversity and conservation of genetic resources. | | |
| | | | |

2. Assessment Tasks for Students

| # | Assessment task* | Week Due | Percentage of Total Assessment Score |
|---|------------------------------|--------------------------|--------------------------------------|
| 1 | Activities and Short Quizzes | Distributed over 8 weeks | 10 |
| 2 | Pre-Final Practical Exam | 8 | 10 |
| 3 | Pre-Final Theoretical Exam | 8 | 25 |
| 4 | Final Practical Exam | 15 | 15 |
| 5 | Final Theory Exam | 16 | 40 |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| | Total | | 100 |

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

- Eight office hours per week per faculty member.
- Academic advising sessions 1hr/ week per faculty member.

F. Learning Resources and Facilities

1. Learning Resources

| | |
|--------------------------------------|--|
| Required Textbooks | <ul style="list-style-type: none"> - Payne, W. J. A. and Willson, R.T. (1999). An introduction to animal husbandry in the tropics. Longman, New York, USA. - Ten Kate, K. and Laird, S. A. (1999). The commercial use of biodiversity: Access to genetic resources and benefit-sharing. Earthscan Publications Ltd, London, UK. - van Zonneveld, M., Dawson, I., Thomas, E., Scheldeman, X., van Etten, J., Loo, J. and Hormaza, J. H. (2014). Genomics of Plant Genetic Resources. Publisher: Springer - Frison, C., Lopez F. and Alcazar, F. T. E. (2011). Plant Genetic Resources and Food Security. ISBN: 978-1-84971-205-7. |
| Essential Reference Materials | <ul style="list-style-type: none"> - <i>Journal of Genetic Resource.</i> - <i>Journal of Animal genetic resources.</i> - <i>Journal of Conservation.</i> - NCBI GenBank overview. |
| Electronic Materials | <ul style="list-style-type: none"> - Saudi Digital Library. - UNSEDOC Digital Library. - www.sciencedirect.com |
| Other Learning Materials | <ul style="list-style-type: none"> - Multimedia that is associated with the textbook and the relevant websites. |

2. Educational and Research Facilities and Equipment Required

| Item | Resources |
|--|---|
| Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) | - A sufficient number of classrooms, well equipped practical laboratories are available to accommodate 30-40 students. |
| Technology Resources (AV, data show, Smart Board, software, etc.) | - Data show projectors and wireless internet connection available for students and faculties. - Smart blackboard. - Computer Portable PowerPoint presentations. |
| Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | - Lecture slides. - Reference Book. - A Note Book for writing notes. - Well-equipped biology laboratory. |

G. Course Quality Evaluation

| Evaluation Areas/Issues | Evaluators | Evaluation Methods |
|---|---|---|
| - Effectiveness of teaching and assessment. | - Students. | • Indirect - Questionnaires. |
| - Quality of learning resources. | - Program committee. - Staff members. - Students. | • Direct - Questionnaires. - Reports. - Meetings. |
| - The extent of achieving the course learning outcomes. | - Program leaders. - Peer Reviewer. | • Direct & Indirect - Questionnaires. - Reports. - Meetings. |
| | | |
| | | |

Evaluation Areas/Issues (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

| | |
|----------------------------|---|
| Council / Committee | Biology Department Members who constructed the program |
| Reference No. | Committee members – The academic year 1441/1442 |
| Date | |