MINUTES

of the Ordinary Meeting of the Board of Studies in Botany held in the Conference Room of the department at 10:30 a.m. on Saturday, the 22nd November, 2014.

Following members were present:

1. Dr. Mansoor Alam
2. Prof. Parvez Q. Rizvi
3. Prof. Mohammad Anis
4. Prof. Mohd Yunus Khalil Ansari
5. Prof. Nafees Ahmad Khan
6. Prof. Irshad Mahmood
7. Prof. Mansoor Ahmad Siddiqui
8. Prof. Mohd. Badruzzaman Siddiqui
9. Prof. Hisamuddin
10. Prof. Mohammad Masroor Akhtar Khan
11. Prof. Samiullah Khan
12. Prof. Zaki Anwar Siddiqui
13. Prof. Tabreiz Ahmad Khan
14. Prof. Shamsul Hayat
15. Prof. Fareed Ahmad Khan
16. Prof. Altaf Ahmad
17. Dr. Athar A. Khan
18. Dr. Anwar Shahzad
19. Dr. (Mrs.) Shahla Faizan
20. Dr. Asim Masood
21. Dr. Tariq Aftab
22. Dr. (Mrs.) Ghazala Parveen
23. Prof. (Mrs.) Sheila Shahab
24. Prof. (Mrs.) Razia Khatoon Zaidi
25. Prof. Moinuddin
26. Dr. (Mrs.) Kiran Lata Chauhan
27. Dr. Fauzia Naushin
28. Prof. Firoz Mohammad (In the chair)

Before taking the agenda of the meeting chairman on behalf of the BOS and his own behalf welcomed Prof. Altaf Ahmad on joining the department as Professor.
The following items of the agenda were taken up:

**Item No. 1**  
The minutes of meetings of Board of Studies held on 22.10.2013, 26.11.2013, 26.12.2013, 12.04.2014, 23.05.2014 and 04.10.2014 were considered for confirmation after minor corrections.

**Item No. 2**  
The board considered and approved the admission of following candidates to M. Phil. and Ph.D. Course (Botany) - 2014-2015 under revised decision of the Academic Council. M. Phil and Ph.D. Course programmes (Paper II) of the candidates are given as [Annexure I](#).

**Item No. 3.**  
The Board considered and approved the proposal of Prof. Firoz Mohammad to hold a two days National Conference in 2015 under the PURSE Program.

**Item No. 4**  
The Board considered and approved a minor correction in the existing qualification for M.Sc. (Botany) Admission Entrance Test.

(i) (a). B.Sc. (Hons) with Botany as the main subject along with Chemistry and Zoology as subsidiary subjects  

Or

(b). B.Sc. with Botany along with two optional subjects amongst Chemistry, Zoology, Genetics and Environmental Science in both first and second year and any one or two of the above optional subjects in third year.

(ii). The candidate must have secured at least 55% marks in Botany as well as in aggregate (Botany+ Subsidiary/Optional subjects).

(iii). Additional Subjects opted at the expense of the above mentioned subject will disqualify the candidature.
Item No. 5 Matter related to research

(a) Minor /Major changes were discussed and approved

A. Minor Changes (Specifications)

(i). Mr. Mudasir Irfan Dar (D.O.R: 22.06.2011) - Ph.D.

New Topic
Biotransfer of cadmium, lead and zinc from sewage sludge and fly ash amended soil in mustard – aphid – beetle food chain.

Old Topic
Studies on the uptake and accumulation of some selected toxicants upto tritrophic level.

(ii). Mr. Aamir Raina (D.O.R: 06.05.2014) - Ph.D.

New Topic

Old Topic
Studies on the Induction and Screening of High Yielding Mutants in Cowpea (Vigna sinensis [L.] Savi.).

New Topic

In vitro strategies on morphogenesis and conservation of threatened medicinal plant species, *Tecomella undulata* (Sm.) Seem. and *Withania coagulans* (Stocks) Dunal.

Old Topic

In vitro strategies of morphogenesis and conservation of some threatened medicinal plant species.


New Topic

Propagation and conservation of *Albizia lebbeck* (L.) Benth. and *Gymnema sylvestre* (Retz.) R.Br. ex Sm. through biotechnological approaches.

Old Topic

Propagation and conservation of some potential medicinal plants through biotechnological approaches.

(b). Cancellation of admission

The admission of Mr. Waseem Kaiser (En No.FF-1789) was cancelled on the recommendation of research supervisor owing to long absence without any information and failure to continue for 2014-15.

(c). The M.Phil./Ph.D. syllabus of course I (course work) was slightly modified and approved (Annexure II)
Name of the candidates recommended for admission

Ph.D Course:

1. Ms. Ajmat Jahan
2. Ms. Daraksha Khanam
3. Mr. Sofi Javed Hussain
4. Ms. Arshiya Akeel
5. Mr. Faisal Rasheed
6. Mr. Ahmad Faraz
7. Mr. Mohammad Afaan Fazili
8. Mr. Mohammad Faizan
9. Mr. Razak Hussain
10. Mr. Masudullah Khan
11. Ms. Durre Shahwar
12. Ms. Taiyeba Ahmad
13. Mr. Ruhul Amin
14. Ms. Fariha Raghib
15. Ms. Ashyana Kouser
16. Mr. Sheikh Altaf Hussain
17. Ms. Mehrun Nisha Khanam
18. Mr. Vikas Yadav
To consider the admissions to M. Phil. / Ph. D. course as per recommendation of the Boards of Studies of the Department of Botany, Faculty of Life Sciences held on 12.04.2014 (under revised decision of academic council dated 01.02.2011).

**Admission to Ph.D. Course in Botany (Qualified written test) -2014-15**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>NAME OF THE CANDIDATE</th>
<th>ACADEMIC QUALIFICATIONS</th>
<th>Test Marks 50%</th>
<th>Qualifying Exam. (M.Sc.) 25%</th>
<th>Presentation 15 Marks</th>
<th>Interview 10 Marks</th>
<th>Total Marks</th>
<th>TOPIC</th>
<th>SUPERVISOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ajmat Jahan</td>
<td>B.Sc. M.Sc.</td>
<td>67.87%</td>
<td>77.75%</td>
<td>CCS CCS</td>
<td>23.00</td>
<td>19.43</td>
<td>11.66 07.00 61.09</td>
<td>Effect of Different Fractions of Gamma-Irradiated Carrageenan on Performance of Some Aromatic Plants</td>
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<td>2.</td>
<td>Daraksha Khanam</td>
<td>B.Sc. M.Sc.</td>
<td>69.40%</td>
<td>75.40%</td>
<td>AMU AMU</td>
<td>23.50</td>
<td>18.85</td>
<td>12.00 06.66 61.01</td>
<td>Response of Mentha piperita to the application of plant growth regulators and salt stress</td>
</tr>
<tr>
<td>4.</td>
<td>Arshiya Akeel</td>
<td>B.Sc. M.Sc.</td>
<td>65.73%</td>
<td>73.16%</td>
<td>AMU AMU</td>
<td>22.50</td>
<td>18.29</td>
<td>11.66 06.33 58.78</td>
<td>Study of Karrikins-Mediated Changes in Germination, Growth, Yield and Active Principles of Some Medicinal Plants</td>
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<td>5.</td>
<td>Faisal Rasheed</td>
<td>B.Sc. M.Sc.</td>
<td>60.44%</td>
<td>69.04%</td>
<td>BAU AMU</td>
<td>22.50</td>
<td>17.26</td>
<td>11.66 07.00 58.42</td>
<td>The Role of Phytohormones in reversal of salinity induced photosynthetic capacity inhibition in Indian mustard</td>
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<td>6.</td>
<td>Ahmad Faraz</td>
<td>B.Sc. M.Sc.</td>
<td>61.86%</td>
<td>68.45%</td>
<td>AMU AMU</td>
<td>22.50</td>
<td>17.11</td>
<td>11.33 05.33 56.27</td>
<td>Effects of nanoparticles and their mode of application on the performance of mustard</td>
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<td>7.</td>
<td>Mohammad Afaan Fazili</td>
<td>B.Sc. M.Sc.</td>
<td>61.66%</td>
<td>65.90%</td>
<td>AMU AMU</td>
<td>22.75</td>
<td>16.48</td>
<td>11.00 06.00 56.23</td>
<td>Influence of Different Fractions of Radiation – Processed Sodium Alginate on Essential Oil Production of Various Species of Mentha</td>
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<td>S. No.</td>
<td>NAME OF THE CANDIDATE</td>
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<td>8.</td>
<td>Mohammad Faizan</td>
<td>B.Sc. M.Sc.</td>
<td>60.13% 58.78%</td>
<td>AMU CSU</td>
<td>24.00</td>
<td>14.69</td>
<td>10.66</td>
<td>06.66 56.01 Effects of brassinosteroids in the presence of nanoparticles on the performance of tomato</td>
<td>Prof. Shamsul Hayat</td>
</tr>
<tr>
<td>9.</td>
<td>Razak Hussain</td>
<td>B.Sc. M.Sc.</td>
<td>68.28% 65.33%</td>
<td>BHU AMU</td>
<td>23.25</td>
<td>16.33</td>
<td>11.25</td>
<td>06.50 57.33 Studies on the Selected Enzymes Involved in Trichodermin Biosynthetic Pathway of <em>Trichoderma</em> spp.</td>
<td>Prof. Tabreiz A. Khan Co-supervisor Dr. Yusuf Akhter School of Life Sciences Central University of Himachal Pradesh, Kangra (H.P.)</td>
</tr>
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<td>10.</td>
<td>Masudullah Khan</td>
<td>B.Sc. M.Sc.</td>
<td>69.26% 72.30%</td>
<td>AMU AMU</td>
<td>24.50</td>
<td>18.09</td>
<td>09.00</td>
<td>05.25 56.84 Studies on the interaction of <em>Meloidogyne incognita, Phomis vexans</em> and <em>Ralstonia solanacearum</em> on <em>Solanum melongena</em></td>
<td>Prof. Zaki A. Siddiqui</td>
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<td>11.</td>
<td>Durre Shahwar</td>
<td>B.Sc. M.Sc.</td>
<td>70.20% 77.58%</td>
<td>AMU AMU</td>
<td>23.25</td>
<td>18.94</td>
<td>11.33</td>
<td>06.33 59.85 Study on genetic diversity at Morphological, Cytological and Molecular levels in <em>Brassica</em> species</td>
<td>Prof. M.Y.K. Ansari</td>
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<td>12.</td>
<td>Taiyeba Ahmad</td>
<td>B.Sc. M.Sc.</td>
<td>64.60% 71.50%</td>
<td>AMU AMU</td>
<td>22.50</td>
<td>17.87</td>
<td>11.33</td>
<td>06.33 58.03 Study on Genetic Diversity in <em>Linum usitatissimum</em> L. at Cytomorphological, Biochemical and Molecular Levels</td>
<td>Prof. M.Y.K. Ansari</td>
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<td>13.</td>
<td>Ruhul Amin</td>
<td>B.Sc. M.Sc.</td>
<td>74.40% 75.79%</td>
<td>AMU AMU</td>
<td>22.75</td>
<td>18.95</td>
<td>10.00</td>
<td>05.00 56.70 Evaluation of quantitative characteristics in some mutant lines of <em>Nigella sativa</em> L.</td>
<td>Prof. Samiullah Khan</td>
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<td>14.</td>
<td>Fariha Raghib</td>
<td>B.Sc. M.Sc.</td>
<td>65.60% 71.40%</td>
<td>AMU AMU</td>
<td>24.00</td>
<td>17.40</td>
<td>10.33</td>
<td>06.00 57.73 Bioavailability of metals in ecosystem and their consequences.</td>
<td>Prof. Fareed A. Khan</td>
</tr>
<tr>
<td>15.</td>
<td>Ashyana Kouser</td>
<td>B.Sc. M.Sc.</td>
<td>63.39% 62.18%</td>
<td>JUK AMU</td>
<td>23.00</td>
<td>15.54</td>
<td>07.33</td>
<td>04.33 50.20 Ecology and Conservation Status of <em>Buxus wallichiana</em> Baill. (BUXACEAE) in Jammu Region</td>
<td>Prof. Athar A. Khan Co-supervisor Dr. Tariq Husain Senior Principal Scientist Herbarium Division NBRI, Lucknow</td>
</tr>
<tr>
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<td>16.</td>
<td>Sheikh Altaf Hussain</td>
<td>B.Sc. M.Sc.</td>
<td>56.11% 84.30%</td>
<td>KUK BPU</td>
<td>22.50</td>
<td>21.07</td>
<td>10.66</td>
<td>06.33 60.56</td>
<td>In vitro studies on growth and morphogenesis of some potential medicinal plants</td>
</tr>
<tr>
<td>17.</td>
<td>Mehrun Nisha Khanam</td>
<td>B.Sc. M.Sc.</td>
<td>62.00% 71.79%</td>
<td>AMU AMU</td>
<td>22.50</td>
<td>17.94</td>
<td>11.33</td>
<td>07.00 58.77</td>
<td>Micropropagation and Control of Morphogenesis in Tissue Culture of Some Medicinal Plants</td>
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<tr>
<td>18.</td>
<td>Vikas Yadav*</td>
<td>B.Sc. M.Sc.</td>
<td>76.44% 71.37%</td>
<td>BAU AMU</td>
<td>22.50</td>
<td>19.11</td>
<td>09.66</td>
<td>05.66 56.93</td>
<td>Development of In vitro morphogenesis system, estimation of bioactive compounds and genetic fidelity of regenerants in selected medicinal plants of economic importance</td>
</tr>
</tbody>
</table>
Any other item

1. Prof. Irshad Mahmood raised the issue of progress of DRS in the department. Board discussed the matter and a committee of the following faculty was constituted to ensure the entry of items purchased under departmental research programmes in the permanent stock register of the department.

   1. Prof. M. Yunus Khalil Ansari (Convener)
   2. Prof. Nafees A. Khan
   3. Prof. Irshad Mahmood
   4. Prof. Samiullah Khan
   5. Dr. Anwar Shahzad

2. The revised Evaluative Report of the department submitted to NAAC office was considered and approved.

(Firoz Mohammad)
Professor & Chairman

Copy to:

1. All members of Board of Studies.
2. Dean, Faculty of Life Sciences.
3. Dy. Registrar (Councils).

(Firoz Mohammad)
Professor & Chairman
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Ms. Ajmat Jahan (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Prof. Mohammad Masroor Akhtar Khan


Maximum marks: 100
Theory: 60
Sessional/Practical: 40


Unit-II  Essential Oils: Definition, historical account, general properties, classification and structure (Biochemistry and Molecular Biology of Plants by Buchanan et al. (2000); Plant physiology by Dieter Hess (1985); Essential Oils by Guenther.

Unit-III Use of Gamma Irradiated Polysaccharides as Plant Promoters: Effect of oligomers obtained from gamma-irradiated polysaccharides on various plants. (1) PhD thesis of M. Idrees (2) PhD thesis of Tariq Aftab (3) PhD thesis of Nadeem Hashmi and related research papers published in the lab.

Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Mr. Sofi Javed Hussain (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Prof. Nafees A. Khan

Topic of Research: Mechanisms of Salicylic Acid Mediated Protection of Photosynthetic Potential in Salt Treated Mungbean

Maximum marks: 100
Theory: 60
Sessional/Practical: 40

Unit-I Origin and distribution of mustard, cultivation of mustard, economic-nutritional importance of mustard

Unit-II Role of phytohormones in salt tolerance, biosynthesis of salicylic acid, ethylene and nitric oxide, functions of salicylic acid, ethylene and nitric oxide under abiotic stress, cross talk between salicylic acid and other plant hormones.

Unit-III Pathways and regulation of sulfur assimilation, Involvement of sulfur containing compounds in salt tolerance, interaction of sulfur, carbon and nitrogen metabolism.

Unit-IV Essential and beneficial nutrients, criteria for essentiality, role of primary nutrient elements (nitrogen, phosphorus, potassium, sulfur) in plant growth and development, techniques for nutritional studies.
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: **Ms. Arshiya Akeel (En No. ) (D.O.R.)**
Name of Supervisor & Internal Examiner: **Prof. Mohammad Masroor Akhtar Khan**

**Topic of Research:** Study of Karrikins-Mediated Changes in Germination, Growth, Yield and Active Principles of Some Medicinal Plants.

**Maximum marks: 100**

Theory: 60
Sessional/Practical: 40

**Unit-I**


**Unit-II**

**Plant hormones:** Physiological role and effects of auxins, gibberellins, cytokinins, abscisic acid, ethylene and karrikins. Karrikins: A new family of plant growth regulators in smoke (Chiwocha et al. 2009).

**Unit-III**


**Unit-IV**

**Medicinal Plants:** Botany, distribution, cultivation, varieties, chemical composition and diseases etc. of some medicinal plants with special reference to


(iii) **Foeniculum vulgare** L. [ Wealth of India, 2003 pp.144-147].
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Mr. Ahmad Faraz (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Prof. Shamsul Hayat

Topic of Research: Effects of nanoparticles and their mode of application on the performance of mustard.

Maximum marks: 100
Theory: 60
Sessional/Practical: 40

Unit I Mustard (Brassica juncea): Botany, distribution, uses, cultivation, varieties, chemical composition.

Unit II Nanoparticles: Characterization, Formation and Toxicity in relation to plants.

Unit III Nanoparticles: Role in plant growth, development, photosynthesis and enzyme activities.

Unit IV Photosynthesis: Physiological and Ecological Considerations.
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Mr. Mohammad Afaan Fazili (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Prof. Mohammad Masroor Akhtar Khan

Topic of Research: Influence of Different Fractions of Radiation–Processed Sodium Alginate on Essential Oil Production of Various Species of Mentha

Maximum marks: 100
Theory: 60
Sessional/Practical: 40


Unit-III  Use of Gamma Irradiated Polysaccharides as Plant Promoters: Effect of oligomers obtained from gamma-irradiated polysaccharides on various plants. (1) PhD thesis of M. Idrees (2) PhD thesis of Tariq Aftab (3) PhD thesis of Nadeem Hashmi and related research papers published in the lab.

Unit-IV  Medicinal Plants: (a) Mentha arvensis L. Botany, distribution, cultivation, varieties, chemical composition and diseases etc. ('Wealth of India, 2003, pp.339-341). (Ous Gyanya, CIMAP, Lucknow (pp. 4-5). (b) Mentha piperata L.: Botany, distribution, cultivation, varieties, chemical composition and diseases etc. (Wealth of India’, 2003, pp.124-125). (Ous Gyanya, CIMAP, Lucknow (pp.4-5). (c) Mentha spicata L. : Botany, distribution, uses, cultivation, varieties, chemical composition and diseases etc. [Wealth of India, 2003, pp.451-457). (Ous Gyanya, CIMAP, Lucknow (pp.4-5).
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Mr. Mohammad Faizan (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Prof. Shamsul Hayat

**Topic of Research:** Effects of brassinosteroids in the presence of nanoparticles on the performance of tomato.

**Maximum marks:** 100
- **Theory:** 60
- **Sessional/Practical:** 40

**Unit-I**
(a) Brassinosteroids: Occurrence and Chemical Structure in Plants.
(b) Physiological effects related to brassinosteroids application in plants.

**Unit-II**
(a) Immunoassays of brassinosteroids
(b) Transcriptomics and proteomics study in regulation of brassinosteroids.

**Unit-III**
Nanoparticles: Role in plant growth, development, photosynthesis and enzyme activities.

**Unit-IV**
Tomato (*Lycopersicon esculentum*): Botany, distribution, uses, cultivation, varieties, chemical composition.
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Mr. Razak Hussain (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Prof. Tabreiz A. Khan

Topic of Research: Studies on the selected Enzymes Involved in Trichodermin Biosynthetic Pathway of *Trichoderma* spp.

Maximum marks: 100
Theory: 60
Sessional/Practical: 40

Unit-I  Introduction to microorganism- General characteristics of agriculturally important microorganisms: General account of PGPRs And PGPTFs, *Trichoderma* as bio-control agent: progress and constraints. Mechanisms of action of beneficial soil microbes: Complex substrate degradation/ siderophores production, phytohormone production and Pathogen suppression.

Unit-II  Bacteria-Bacteria and Bacteria- Host: Introduction, Quorum sensing in *Agrobactrium tumefaciens* - a ubiquitous pathogen. Signaling in gram-positive bacteria: Butyrolactones and Peptide signaling.

Unit-III  Control measures of disease in plants: regulatory, cultural, breeding for disease resistance, biological and physical methods. Integration of management practices. Botany, cultivation and uses of tomato.

Unit-IV  Diseases of tomato and their control:
    a) Seedling diseases caused by fungi
    b) Root-knot nematode disease
    c) Wilt and blight disease caused by fungi
    d) Wilt disease caused by bacteria
    e) Rhizoctonia root-rot and crown rot disease)
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Mr. Masudullah Khan (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Prof. Zaki A. Siddiqui

Topic of Research: Studies on the interaction of Meloidogyne incognita, Phomsis vexans and Ralstonia solanacearum on Solanum melongena.

Maximum marks: 100
Theory: 60
Sessional/Practical: 40

Unit-I  Role of enzymes, growth regulators and toxins in pathogenesis, Effect of infection on physiology of plants (photosynthesis, translocation, respiration, membrane permeability, transcription and translation), Disease resistance mechanism in plants, performed substances and structures, induced structures and biochemical defense.

Unit-II  Morphology and anatomy of nematodes, Structural detail of oesophaghi, excretory, nervous and reproductive systems. Life cycle of Meloidogyne, Bacterial wilt of Brinjal caused by Ralstonia, symptoms, impact of disease, life cycle of Ralstonia, and its management, Phomsis blight of brinjal, life cycle and its management.

Unit-III  Brinjal, its cultivation, production and nutrient value, major disease of Brinjal, Concept of plant disease, Host parasite relationship in nematode infection, Effect of abiotic factors in nematode multiplication, Interactions of plant parasitic nematodes with fungi and bacteria, nematode-nematode interactions.

Unit-IV  Broad principles of plant disease management, Disease forecasting, Integrated pest management, Regulatory and physical measure of disease management, Management of disease by culture practice, cropping sequences, organic amendments, Biocontrol of fungal and nematode disease, Use of nanoparticles in plant disease management.
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Ms. Durre Shahwar (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Prof. M.Y.K. Ansari

Topic of Research: Study on genetic diversity at Morphological, Cytological and Molecular levels in Brassica species.

Maximum marks: 100
Theory: 60
Sessional/Practical: 40

Unit-I **In vitro mutagenesis**: Techniques of tissue culture, preparation of stock solution and buffers, constituents of nutrient medium, Protoplast culture. Scope of in vitro mutagenesis.

Unit-II **Transgenetics in crop improvements**: Insect resistance, disease resistance, resistance to abiotic stress, herbicide resistance.

Unit-III **Structural and Numerical changes in Chromosomes**: Deficiencies, duplication, translocations, inversion. Aneuploidy and euploidy. Significance of haploidy.

Unit-IV **Molecular Markers**: Types and utility of molecular markers in genetic diversity analysis in crop plants, molecular markers: co dominant markers (allozymes, RFLPs, RAPD, AFLP).
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: **Ms. Taiyeba Ahmad (En No.) (D.O.R.)**
Name of Supervisor & Internal Examiner: **Prof. M.Y.K. Ansari**

**Topic of Research:** Study on Genetic Diversity in *Linum usitatissimum* L. at Cytomorphological, Biochemical and Molecular Levels.

Maximum marks: 100
Theory: 60
Sessional/Practical: 40

**Unit-I**  
**In vitro mutagenesis:** Techniques of tissue culture, preparation of stock solution and buffers, constituents of nutrient medium, Protoplast culture. Scope of in vitro mutagenesis.

**Unit-II**  
**Transgenetics in crop improvements:** Insect resistance, disease resistance, resistance to abiotic stress, herbicide resistance.

**Unit-III**  
**Structural and Numerical changes in Chromosomes:** Deficiencies, duplication, translocations, inversion. Aneuploidy and euploidy. Significance of haploidy.

**Unit-IV**  
**Molecular Markers:** Types and utility of molecular markers in genetic diversity analysis in crop plants, molecular markers: co dominant markers (allozymes, RFLPs, RAPD, AFLP).
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Mr. Ruhul Amin (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Prof. Samiullah Khan

Topic of Research: Evaluation of quantitative characteristics in some mutant lines of *Nigella sativa* L.

Maximum marks: 100
Theory: 60
Sessional/Practical: 40

Unit-I  The Crop Improvement: Possibilities and Scope of crop improvement, Evolutionary trend and development of cultivars, Goals of plant breeding, Recent trends in plant breeding, Production and improvement of medicinal plants.

Unit-II  Mutation Breeding: Classification of mutation, Physical and Chemical mutagens, Molecular basis of mutation, Site directed mutagenesis, Mutations induced by transposons, Management of M₁, M₂, and M₃ generations.

Unit-III  Reproductive System in Crop Plants: Amphimixis, Apomixis – Types and genetics, Advantages of apomixis in plant breeding, Exploitation of apomixis in crop improvement.

Unit-IV  Incompatibility and Male Sterility: Incompatibility- types, uses and methods of overcoming incompatibility. Male sterility- classification, genotypic basis and phenotypic basis.

Unit-V  Biometrical Techniques in Plant Breeding: Statistical characteristics of sample with quantitative variation (mean, standard deviation, coefficient of variation, error of mean); Analysis of variance, Components of variance, Correlation coefficient analysis, Tests of statistical significance- 't' test and least significant difference (LSD).
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Ms. Fariha Raghib (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Prof. Fareed A. Khan

Topic of Research: Bioavailability of metals in ecosystem and their consequences.

Maximum marks: 100
Theory: 60
Sessional/Practical: 40

Unit-I Ecosystem structure and function, productivity concept, energy flow, food chain, food web, trophic structure and ecological pyramids.

Unit-II Population ecology, ecological amplitude and law of tolerance, population characteristics, survivorship curves, population growth, age distribution, fluctuations in population.

Unit-III Interactions among species, k and r selection strategies, Plant resistance and susceptibility to herbivory, ecads and ecotypes, plants as ecological indicators.

Unit-IV Soil profile and classification, soil composition, soil pollution by Heavy Metals and Nanomaterials - sources, effects and control.
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Ms. Ashyana Kouser (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Dr. Athar Ali Khan


Maximum marks: 100
Theory: 60
Sessional/Practical: 40

Unit-I  **General Ecology, Environment and Population Ecology:** Evolution of ecological thought; Environmental sustainability; Environmental ethics; Biological invasion: Nature and status of invasive species, invasion process and hypotheses, characteristics of invasive species, entry pathways and vectors, impact of invasive species; State of forests in India; Ecological restoration; Environmental impact assessment; Sustainable development and ecological economics; Biomes; Hotspots. Definition of population; Characteristics of populations; Population growth forms; Population regulation; Life history strategies; Population genetics and natural selection; Strategies of adaptations in plants.

Unit-II  **Community and Ecosystem Ecology:** Community: definition, nature, structure and attributes, keystone species and their role in community control; Trophic downgrade, assembly rules, neutral hypothesis. Ecosystem: Concept, types, energy flow, productivity, energy budget; nutrient cycling (carbon, nitrogen, phosphorus and sulphur), environmental impact of imbalanced nutrient cycles, external and internal nutrient budgets; Critique of ecosystem concept; Ecosystem stability.

Unit-III  **Biodiversity:** History and concept, levels, types of ecological diversity; Importance of biodiversity; Biodiversity crisis and its drivers; possible impact of climate change, ozone layer depletion and urban expansion on biodiversity; possible impact of changing politico-economic paradigm on biodiversity; Biodiversity Conservation (ex-situ and in-situ); concept of species richness and evenness; Diversity indices (Simpson, Shannon, Margalef’s and Menhinick’s indices); Importance of biodiversity, latitudinal pattern of biodiversity; application remote sensing and GIS in biodiversity mapping.

Unit-IV  **Conservation Ecology and IUCN Resources:** History of IUCN, evolution of IUCN Categories of Threat and Criteria, detailed study of current IUCN Red List Categories and Criteria; Unified Classification of Threats and Actions (Salafsky et al., 2007); Global Strategy of Plant Conservation; Various Guidelines issued by IUCN; Documentation Standards And Consistency Checks For IUCN Red List Assessments and Species Accounts (version 2, 2013); Rules of Procedure IUCN Red List Assessment Process 2013–2016 (version 2); Working knowledge of Red List; Fundamentals of Conservation Ecology; Protected area Network of India and World.
Ph.D. Syllabus of Course-II (Internal)

Name of the Candidate: Ms. Mehrun Nisha Khanam (En No.) (D.O.R.)
Name of Supervisor & Internal Examiner: Prof. Mohammad Anis

Topic of Research: Micropropagation and Control of Morphogenesis in Tissue Culture of some Medicinal Plants.

Maximum marks: 100
Theory: 60
Sessional/Practical: 40

Unit-I Biotechnology: Basic concepts, Historical aspects, Concept of cellular totipotency, Clonal propagation, regulation of cell cycle and cell division, haploid production and their utility. Somatic hybridization and cybridization. Application of PTC in Crop improvement, Cryopreservation and tissue culture repositories, Secondary metabolite production, hairy root cultures.

Unit-II Regeneration & Micropropagation: Direct and indirect organogenesis, function and mechanism of action of auxins and cytokinins, auxin-cytokinin interaction, Abscissic acid, gibberellins and ethylene. Anti-auxins and their importance. Meristem and shoot tip culture, their applications. Somatic embryogenesis, Synthetic seed and application.


Unit-IV Molecular Markers & Genomics: DNA molecular markers, principles, types and applications, PCR-based and non-PCR-based markers. Structural and functional genomics, DNA library, DNA micro array technology, DNA fingerprinting, Genetic diversity and genetic analysis, their significance in plant biotechnology.
SYLLABUS FOR M.Phil./Ph.D. Course Work
(One semester starting w.e.f. date of admission)

Course I

Unit I. Research Methodology and Ethics:
Preparation of stains, fixatives, stock solutions, Media (MS medium, PDA, Richards medium); DNA isolation, Protein analysis/ estimation, soil and water culture, Histopathological techniques, Autoradiography, population dynamics, protoplast isolation and somatic hybridization, synthetic seed technology, genetic transformation methods, techniques of haploid and double haploid production, Immuno techniques. Plagiarism: Etymology and concept, Legal aspects, In academia and journalism, Self plagiarism, Code of ethics

Unit II. Quantitative Methods:
Measurement of growth parameters, Quantitative tests for carbohydrates, proteins, lipids, DNA analysis, purification, preservation and maintenance of culture, micrometry, techniques for preparation of fungal inoculation, preparation of slides pertaining of cytology, fungus, nematodes and microrhiza, soil sampling, extraction and transmission of viruses, collection of plant material, herbarium preparation.

Unit III. Basic Computer application and Statistics.
I. Micro soft office 2010 (MS word, Excel, Power Point)
II. Correlations analysis: Positive and negative correlations; Linear and non-linear correlations – by using Sigma plot 12.0
III. Regression analysis: Meaning, types regressions lines, equations – by using Sigma plot 12. 0. 0
IV. SPSS II (Chicago, USA)
   • One – way ANOVA
   • Two – way ANOVA
   • TMRT (Tuquies Multiple Range Test)
V. Mean, Median, Mode, t- test, Chi-square test, LSD test.
Unit IV. Tools and Equipments, their principles & working:
Balances, Compound and light microscope, BOD Incubator, laminar flow, microwave oven, magnetic stirrer, spectrophotometer, Atomic absorption spectrophotometer, Electron microscopy (TEM, SEM), PCR technique, electrophoresis, blotting techniques, chromatography, Autoclave, Centrifuge, Colorimeter, Deionizer, Distillation apparatus, Incubator & Furnace, hot plate, waterbath, microtome, pH meter, Shakers, Plant growth chamber.

Course II Marks - 100

Submission of critical and comprehensive review article based on assigned problem to each research scholar, which will be observed for-
   a. Quality of review
   b. Presentation before the committee consisting of- 1. Supervisor, 2. One senior person from the area of research and 3. Chairman.
   c. Viva voce based on review
      With weightage of 50%, 25%, 25% respectively for a, b and c.