

CHAPTER VII :- Standard Format For Syllabus Framework

**SHIVAJI UNIVERSITY,
KOLHAPUR.**



***** A
Accredited By NAAC

Post Graduate Diploma in Agrochemistry
(Subject to the modifications to be made from time to time)
Syllabus to be implemented from June 2008 onwards.

A] **Ordinance and Regulations:-**
(as applicable to diploma/programme)

B] **Shivaji University, Kolhapur**
New Syllabus For
Post Graduate Diploma in Agrochemistry

1. **TITLE : Subject**
Optional/Compulsory/Additional/IDS under the Faculty of -----

2. **YEAR OF IMPLEMENTATION:-** New Syllabus will be implemented from June 2008 onwards.

3. **PREAMBLE:-**

The Board of Studies should briefly mention foundation, core and applied components of the course/paper. The student should get into the prime objectives and expected level of study with required outcome in terms of basic and advance knowledge at examination level.

4. **GENERAL OBJECTIVES OF THE COURSE/ PAPER/ :**
(as applicable to the Diploma /Subject- Paper concerned)

- 1) Resource Management
- 2) Crop Pathology & Pest Management
- 3) Modern Techniques in Agriculture
- 4) Food Technology
- 5) Practical (I,II,III,IV)
- 6) Project

5. **DURATION**

- The course shall be a full time course
- The duration of course shall be of one year.

6. **PATTERN:-**

Pattern of Examination will be Annual.

7. FEE STRUCTURE:- (as applicable to regular course)

i) Entrance Examination Fee (If applicable)- As per university. (Not refundable)

ii) Course Fee- as listed below

Particulars	Rupees
Tuition Fee	Rs.8000/-
Laboratory Fee	Rs.1000/-
Computer Fee	Rs.1000/-
Annual/Semester fee- Per student	Total Rs.10,000/-

Other fee will be applicable as per University rules/norms.

8. IMPLEMENTATION OF FEE STRUCTURE:-

In case of revision of fee structure, this revision will be implemented in phase wise manner as mentioned below:-

9. ELIGIBILITY FOR ADMISSION :-

As per eligibility criteria prescribed for each course and the merit list in the qualifying examination.

10. MEDIUM OF INSTRUCTION :

The medium of instruction shall be in English. (as applicable to the course/programme concerned.)

11. STRUCTURE OF COURSE- -----

(Note – The structure & title of papers of the degree as a whole should be submitted at the time of submission/revision of first year syllabus.

FIRST YEAR ----- (NO.OF PAPERS-----)

Sr.No.	Subjects	Marks
1.	Resource Management	100
2.	Crop Pathology & Pest Management	100
3.	Modern Techniques in Agriculture	100
4.	Food Technology	100
5.	Practical (I,II,III,IV)	200
6.	Project	100
	Total	700

12. **SCHEME OF TEACHING AND EXAMINATION:-**
 [The scheme of teaching and examination should be given as applicable to the course/paper concerned.]

FIRST YEAR

Sr. No.	Subject /Paper	Teaching Scheme (Hrs/Week)				Examination Scheme (Marks)		
		L	T	P	Total	Theory	Term Work	Total
1	Resource Management			3	50	100		
2	Crop Pathology & Pest Management			3	50	100		
3	Modern Techniques in Agriculture			3	50	100		
4	Food Technology			3	50	100		
5	Practical (I,II,III,IV)			20	144	200		
6	Project				72	100		
	Total			32	416	700		

* One P=45min.

13. **SCHEME OF EXAMINATION :-**

- The examination shall be conducted at the end of each academic year.
- The Theory paper shall carry 100/---- marks.
- The evaluation of the performance of the students in theory papers shall be on the basis of Annual Examination of 700 marks.
- Question Paper will be set in the view of the /in accordance with the entire Syllabus and preferably covering each unit of syllabi.

14. **STANDARD OF PASSING:-**

As Prescribed under rules & regulation for each diploma programme.

15. **NATURE OF QUESTION PAPER AND SCHEME OF MARKING :-**

(Unit wise weightage of marks should also be mentioned)

16. **EQUIVALENCE IN ACCORDANCE WITH TITLES AND CONTENTS OF PAPERS- (FOR REVISED SYLLABUS)**

17. **SPECIAL INSTRUCTIONS, IF ANY.**

NEW SYLLABUS FOR
Post Graduate Diploma in Agrochemistry

(Introduced from June 2008 onwards)

- Paper I : Resource Management** [50]
- A. Water Management. [5]
Source, composition, micronutrients, water pollution
- B. Soil Management : [15]
Introduction, types of soil, soil morphology, soil and water, soil components (organic and inorganic), soil microbes and soil fertility, biofertilisers, biocompost, soil testing, soil managements, organic farming, microbial culture.
- C. Seed technology : [15]
Definition, morphology, seed physiology, seed processing and certification seed testing, seed testing, seed pathology, seed management
- D. Equipment in Agriculture. [15]

Practical I

1. Determination of pH of water of pH meter/conductivity meter.
2. Determination of nitrate from water.
3. Analysis of lime content of soil.
4. Colorimetric estimation of Fe, Zn, Mn, B, Cu, Mb from soil
5. Photometric determination of K⁺, Na⁺, Ca⁺⁺, Mg⁺⁺, in soil.
6. Nephelometric estimation of sulphate and phosphate.
7. Determination of Organic carbon.
8. Conductometric analysis of salinity of soil
9. Colorimetric analysis of phosphorous from soil
10. Flame Photometric Estimation of potassium from soil.
11. Estimate of nitrogen by Kjeldahl's method.
12. Study of soil structure and texture.
13. Study of water hlding capacity of soil.
14. Isolation of soil pathogens

15. Microbial cultures : a. Trichoderma culture b. Rhizobium culture.
16. Biocompost preparation
17. Morphology of seed (Dicot and Monocot)
18. Seed testing to know % viability.
19. Seed born diseases
20. Seed pests.
21. Agriculture equipments.

Paper II : Crop Pathology & Pest Management [50]

A. Cultivation practices of regional crops [2]

Jawar, Wheat, Ground nut, Sunflower, Gram, Sugarcane, Tobacco, Brinjal, Cabbage/Chili/tomato, Mango, grapes.

B. Plant Pathogens and their Management. [8]

Definition, disease concept and terminologies, classification, methods of studying plant pathogens, mechanism of plant infection, diseases with respect to regional crops : Grain smut of Jawar, Leaf bright of gram, Black stem rust of wheat, Whip smut of sugarcane, MLO disease in tobacco, Tikka disease of ground nut, Bacterial wilt of brinjal, Leaf rust of sunflower, Powdery mildew of mango, Downy mildew of grapes. Crops disease management : cultural ; mechanical, chemical, biological measures of control.

C. Plant Pests : [7]

Definition and losses caused by insect pests, general characteristics of insect pests, scientific names, marks of identification, host range, life cycle, carryover, nature of damage and management, crops pests with respect to regional crops.

Jawar (Stem borer) gram (pod borer) sugarcane (Woolly aphids) tobacco (aphids) ground nut (leaf roller) brinjal (Fruit borer) tomato (Fruit borer) mango (jassids), (Thrips)

D. Weed management : [4]

Definition, classification, reproduction, mode of dispersal, study of weeds with respect to crops, Parthenium hysterosporus, Portulaca oleracea, Argemone mexicana, Cyprus rotundus, Euphorbia hirta/microphylla, Panicum column, Celocia argentia, Oxalis corniculata, Alternanthera spinosa, Orobranchae Striga, Amaranthus viridis.

Methods of weed management : cultural, biological and chemical measures of control.

E. Chemical Pesticides : [12]

a. Classes of Pesticides :

Class as per chemistry and as per application; Insecticides, fungicides, herbicides, rodenticides, International pesticide market size, Importance of herbicides in the international market; Indian pesticide market ; Importance of insecticides in Indian market; Pesticide usage per hectare in India as against in other countries.

b. Important Examples from Each chemical class :

Pyrethroids – Alphamethrin, Lambda – cyhalothrin, Biphenthrin; Organo phosphorous compounds – Profenophos, Triazophos, Quinalphos, Ethion;

Carbamate Pesticides – Mancozeb, Methomyl, Ziram, Zineb; Inorganic Compounds : Inorganic Fungicides – Sulphur, Copper Salts; Inorganic fumigant – hydrogen cyanide ; Inorganic rodenticides – Zinc phosphides; Herbicides – Imidazolinones, Dimetholin, Sulphonyl Urea, Dinitroaniline, Butachlor, Trifluralin, Auxadiazines; Organo-tin compounds.

c. Role of IPR in pesticides development.

d. Pesticides formulations :

Purpose ; Adjuvants; Application of formulations; Wettable and flowable powders ; Emulsions; Emulsifiable concentrates; Aqueous suspension; Solution Concentrates; Dust; Aerosol; Granules; Slow release granules; Baits; Modern safer formulations verses earlier formulations.

e. Health hazards and environmental impacts of residential pesticides.

F. Manufacture of Agrochemicals : [10]
Phenyl pyrazole – new class of chemistry; Endosulphan; Chlopyriphos; Carbamyl; Alphamethrin.

G. Biological Control of Pests : [5]

Practical Syllabus

Practical II

1. Agronomic study of following crops with respect to gross morphology for crop identification : Jawar, Wheat, Ground nut, Sunflower, Gram, Sugarcane, Tobacco, Brinjal, Cabbage/Chili/tomato, Mango grapes.
2. Study of diseases with respect to host, casual organism, symptoms : All diseases above chapter B in theory paper.
3. Insect pests as per theory.
4. Determination of acidity of given pesticides sample.
5. Determination fo alkalinity of given pesticide sample.
6. Chromatographic separation of Cd, Zn, and Mg by Ion exchange chromatography.
7. Chromatographic analysis of Cu, Zn, Mn and Co by Ion exchange chromatography.

Detection of pesticide residue in plants.

Paper III : Modern Techniques in agriculture : [50]

A. Plant Tissue culture : [15]

Introduction, laboratory, organization, nutrient media, Aseptic manipulation, instruments. Cell and tissue culture, organ culture, Haploid production, ovary and embryo culture, protoplast isolation and culture, somatic embryo genesis, somatic hybridization, micropropagation, secondary metabolites.

- B. Green house management : [2]
Introduction, types designing of green house, cultural practices, maintenance
- C. Landscape designing. [2]
- D. Biofuels : [2]
Introduction, Plants of biofuel interest, distillation technique, storage and marketing.
- E. Medicinal Plants cultivation Practices [5]
- F. Animal Husbandary, Pisciculture, Poultry, Sericulture [24]

Practical III

1. Laboratory maintenance
2. Media preparation
3. Explant preparation.
4. Inoculation
5. Organ culture (cell)
6. Protoplast isolation.
7. Micropropagation.
8. Green house management
9. Biofuels (1)
10. Visit to F & submission of Report
11. Medicinal Plants.

Paper IV : Food Technology [50]

- A. Food processing : [22]
1. Introduction to processing. Product Development. Primary Processing
Secondary processing, Types of product, e.g. quick cooking, fast food, fabricated foods, convenience foods. [8]
 2. Additives:- Preservative, Processing, formulation, standardization & Large-scale preparation. [3]
 3. Packaging – Packaging suitability & functions, development & Management Design & Package graphics, labeling, Research & testing. [5]
 4. Transportation:- Types/ modes and optimization of transportation, taking Into account; type of product, distance, storage facilities etc [4]

- B. Dairy Technology:
1. Introduction and Development of Milk processing industry in India, Present status & future scope.
 2. Dairy lay out for small scale: Dairy design & sanitation layout
 3. White Revolution in India.
 4. Food value of milk, composition of milk & factors affecting Composition of milk.
 5. Buying, Receiving, Collection, transportation of milk, storage & distribution of milk.
 6. Processing of milk, filtration, clarification, cream separation, & heat Treatment of milk.
 7. Processing of milk for butter, Ghee, condensed evaporated dried milk, Ice cream etc.
 8. Technology of indigenous milk product, Khoa, Rubri, Lassi, Paneer, Chessee etc.

C. Mushroom Cultivation & its applications.

[4]

D. Agricultural Marketing :

[10]

1. Introduction, Classification, Recent trends in marketing of agricultural goods, Characteristic features of agricultural products small scale production, Agricultural marketing in India, Perishable nature of products. No. concerted conscious marketing activities, AInelasticity of demand, unorganized nature of market, Malpractices in the market.
2. Difference between marketing manufactured goods and agricultural products. Kinds of markets, modern marketing management and agriculture products. Marketing intelligence and agricultural marketing, Marketing of various commodities, food crops, fibre crops, cash crops.

Practical IV

1. Spot test for carbohydrates.
2. Estimation of reducing sugars by Benedict's Method
3. Spot tests for Amino Acids
4. Quantative methods for Amino Acids
5. Protein estimate.
6. Saponification of Fats
7. Estimation of Cholesterol
8. Microbiological examination of packing materials
9. Detection of poisonous (DDT) material.
10. Sampling of milk, Physical examination of milk, Determination of Acidity, Specific gravity, Freezing point & Viscosity. Platform tests, Adultration of milk, Cream-separation, Factors affecting on efficiency and richness of cream, Standerdization & homogenization of milk. Preparation of flavoures & chocolate milk. Visit to Local milk supply scheme.

11. Physical & Biochemical analysis of wastes from different Agro-based industries. (a) Sugar, (b) Distillery, (c) Dairy (d) Food (e) Starch industry, (f) Brewery & Winery (g) Confectionary, (h) Bakery.
12. Study of Caseinase Activity
13. Vitamin B12 Assay & Amylase
14. Study of sof Milk Microbiology ; qualitative and quantitative estimation.
15. Determination of efficiency of Pasteurization.

(vi) Recommended Reading :
(In MLA/APA Style Sheet Format)

- a) Basic Reading :-
- b) Additional Reading :-
- c) References :-

- i) Books
- ii) Periodicals/Journals:

Paper I : Resource Management

[50]

Reference Books :

1. Introductory soil science – Dilip Kumar Das. Kalyani Publishers, Ludhiyana.
2. Dignosis and Improvement of saline and alkali soils – US Salinity Lab staff. Oxford and IBH Publishing Co. New Delhi.
3. The Nature and Properties of soils Tenth edition, NYLE C Brady. Maxwell Macmillan International Edition.
4. Soil Chemical Analysis-Chopra and Kanwar.
5. Fertilizer analysis by FAI (Fertislizer Association of India)
6. Text Book of soil Science – T. D. Biswas, S. K. Mukherjee. Mc Graw Hill Publishing Co.
7. Seed Technology – R. L. Agarwal.
8. Principles of Soil Technology – Dr. G. N. Kulkarni.
9. Principles of Seed Technology and Certification – N. P. Nema.
10. Seeds Science and Technology – Subeer Sen.

Paper II : Crop Pathology & Pest Management

[50]

Reference Books :

1. Text books of Modern Plant Pathology – K. S. Bilgrami and H. C. Dube.
2. Plant diseases – R. S. Singh.
3. Essentials of Plant Pathology – V. N. Pathak.
4. Plant Pathology – R. S. Mehrotra.
5. Introduction to principle of Plant Pathology – R. S. Singh.

6. Plant Pathology – Agrios.
7. Elements of Economic entomology - Vasantraj Devid and T. Kumar Swami.
8. Agricultural Pests of India and South East Asia – A. S. Atwal.
9. General and applied Entomology – K. E. Nayar, B. V. David
10. Plant disease in India – G. Rangaswami.
11. Diseases of cereals and millets – T. S. Ramkrishna.
12. Principles of Plant disease control – S.A.J. Tarr. 1971
13. Scientific principles of crop protection – Mortion, Hubert & David Woodcock Edward Ashold USA.
14. Entomogrow nematodes – Fischeer G.O. Jr.
15. Advances in Mycology & Plant Pathology – R Chaudhari.
16. Text book of Fungi O. P. Sharma – Tata McGraw
17. Elements of Economic Entomology - David & Kumar Swami.
18. Text book of toxicology –Shrivastava
19. Toxicology of Insecticides – Matsumura.
20. Plant origin insecticides.
21. Recent Advances in Host Plant Resistance – S. S. Dhahiliwal.
22. Introduction to In Pest management – G. S. Ahaliwal.
23. Emerging trends in Biological control – T. N. Ananthakrishnan.
24. N. N. Melnikov : Chemistry of pesticides (English) Springer.
25. R. Clemlyn : Pesticides.
26. M. B. Green, G. S. Hartley and T. F. West, Chemicals for Crop improvement and pest management Pergamon).
27. N. B. Scher Controller release pesticides ACS symp. No. 53
28. N.E. Carderlli : Controlled released pesticides Formulation CRC.
29. A.F. Kydonius : Controlled release formulation technologies, CRC.
30. P.C. Keeney and D.D. Kaufman : Herbicide Chemistry, degradation and mode of action Vol. I, II (Dekker)
31. Environmental Chemistry by A.K. De.
32. Chemistry of insecticides and fungicides by Sree Ram.
33. J. Miyamamoto and P.C. Jearney : Pesticides Cheistry Vol. IV (Pergamon)
34. W. Valkenburg. Pesticide Formulations (Dekker)
35. Spectroscopic methods in Organic chemistry – DH Williems and I. Flemming
36. Instrumental methods of analysis – Williard and Merittee, Dean.
37. Application of spectroscopic techniques in Organic Chemistry – P. S. Kalsi.
38. Concepts in analytical chemistry – S. M. Khopkar
39. Advances in pest control research – R. L. Metcalf .
40. Application of absorption in spectroscopy – J. R. Dyer.
41. Soil and Plant analysis – C. s. Piper (Hans Pub)
42. Unit processes in organic synthesis : P. H. Groggins
43. Encyclopedia and chemical technology : Kirk and Othmar.
44. A text books of chemical technology : S. d. Shukla and
45. Encyclopedia of pesticides manufacture.

46. A text book of qualitative Inorganic analysis by A.I. Vogel.
47. Methods of pesticide analysis by Shree Ramulu.
48. Soil and plant analysis by C. S. Piper (Hans Publisher)
49. Analytical Agricultural Chemistry by Chopra and Kanwar
50. Neergaard – Seed Pathology Vol. I & II.
51. Agarwal. V. E. & Sincelair, J. B. Principles of seed pathology Vol I & II.
52. Metcalf & Flint – Desructive & useful Insects.
53. A. S. Atwal – Agricultural Entomology.
54. D. S. Bindra – Plant Protection and equipments.
55. ICAR – Handbook of Agriculture.

Paper III : Modern Techniques in agriculture :

[50]

Reference Book :

1. An Introduction to Plant Tissue Culture (Reprint 1998) By Dr. M. K. Razdan. Oxford and IBH Publishers Co. Pvt. Ltd., New Delhi Culcutta.
2. Handbook of Plant Tissue Culture (Reprint 1997) compiled by A.F. mascarenhas. ICAR. New Delhi.
3. Introduction to Plant Biotechnology (Reprint 2000) by K.S. Bilgrami and A. K. Pandey, C.B.S. Publishers and Distributors Shahadara. New Delhi.
4. Methods in Plant tissue culture (Reprint 2000) By U. Kumar. AGROBIOS (INDIA) Jodhpur.
5. Plant Cell, Tissue and Organ culture – Fundamental Methods (Reprint 1998) By O.L. Gamborg and G.C. Philips. N. K. Mehra for Narosa Publishing home, New Delhi.
6. Introduction to plant Biotechnology (Reprint 2001) H. S. Chawla. Raju Pirmalani for Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
7. Plant Cell Culture (Reprint 1987) R. A. Dixon IRL Press, Oxford Washington D.C.
8. Tissue Culture Propagation of Banana (Reprint 1992) Indian Institute of Horticulture Research Hessaraghatta Lake, Bangalore.
9. Plant Tissue Culture Practical Manual : Plant Tissue Culture Unit. Department of Agriculture Botany. MPKV. Rahuri (MS)
10. Practical Manual for Introduction to plant biotechnology (2000) Botany Department, Agriculture College, Pune MPKV, Rahuri (MS)
11. Practical Manual for introduction to Plant biotechnology (2003) Dr. D. N. Bhamre. Botany Section, Agriculture College, Dhule.
12. Techniques in Plant Tissue Culture (A Laboratory Handbook (1996) Dr. B. L. Lad Prof. Of Botany PGI, MPKV Rahuri.
13. A Text Book of Biotechnology (2001) – R. C. Dubey, S. Chand. & Co. Ltd., Ram Nagar, New Delhi.
14. Modern Concepts in Biotechnology (1999) : H. D. Kumar, UBS Publishers and Distributors Ltd., New Delhi.
15. Elements of Biotechnology (1994) : P. K. Gupta Rastogi & Co. Subhash Bazaar.

16. Biotechnology (Reprint 2001) : B. D. Singh Kalyani Publishers, Rajendra Nagar, Ludhiyana.
17. Plant Cell and Tissue Culture (1994) : S. S. Purohit Tata McGraw Hill Publishers Co. Ltd. New Delhi.
18. A Laboratory Manual of Plant Biotechnology (1999) : S. S. Purohit, GRO BOTANICA, Bikaner.
19. Biotechnology in crop improvement (1998) : Harvinder Singh Chawla. International Book Distribution Co. Lucknow.
20. Agricultural Biotechnology (2nd Edition 2003) : S. S. Purohit Dr. Updesh Purohit for Agrobios Jodhpur India.
21. Biotechnology, Fundamentals and applications. (3rd Edition, 2003) : S. s. Purohit Dr. Updesh Purohit for Agrobios, Jodhpur, India.
22. Breeding Procedure for cross pollinated vegetable crops Swarup V. 1977, ICAR, New Delhi.
23. Bassett M. J. – 1986 – Breeding Vegetable crops, AVI Publishing company.
24. Coulter J. M. – 1973 – Fundamentals of plant breeding, Prakash publishers, Jaipur.
25. Agarwal R. L. – 1998 – Fundamentals of Plant Breeding & Hybrid seed production – Oxford & IBH Publishing Company Pvt. Ltd., - New Delhi.
26. Singh P. & Narayanan S. S. – 1993 – Biometrical techniques in Plant Breeding, Kalyani Publisher – New Delhi.
27. Bhandari M. M. 1979 – Practicles in Plant Breeding – Oxford & IBH Publishing House – New Delhi.
28. Jahir J. & Others – 1996 – Techniques of Plant Cytogenetics, Oxford & IBH Publishing Company Pvt. Ltd., - New Delhi.
29. Singh C. – 1997 – Modern techniques of raising field crops – Oxford & IBH Publishing Company – New Delhi.
30. Vaidya V. G. Sahastrabudde K. R. & V. S. Khuspe – 1983 – Crop Production & Field experimentation, Continental Prakashan, Pune.
31. Das P. C. – 1993 – Vegetable crops of Indai – Kalyani Publishers – New Delhi.
32. Barooah S. - 1993 – Vegetable growing in India – Kalyani Publishers – New Delhi.
33. Chalam G. V. Seed testing manual, ICAR, New Delhi
34. Perry D. A. Seed Vigour Testing, ICAR, New Delhi.
35. Schwass R.H. Seed Quality Control, ICAR, New Delhi.
36. 1992 Legislation on seed ministry of agriculture & cooperation, NSC, Govt. of Indai.
37. Tanwar N. S. & Singh S. v. 1988 Indian minimum Seed certification standards, central seeds committee, department of agriculture Govt. of India, New Delhi.
38. Nema N. P. 1989 Principles of seed certification & testing, Allied Publishers Ltd. New Delhi.
39. Agarwal R. L. 1987 Seed Technology, Oxford & IBH Publishing Company New Delhi.

Paper IV : Food Technology

[50]

(NOTE :

- i) The details of field work, seminar, Group Discussion and Oral examination be given wherever necessary.
- ii) General/Specific instructions for Laboratory safety should be given wherever necessary)

C] OTHER FEATURES :

1. INTAKE CAPACITY / NUMBER OF STUDENTS:- 30
(Wherever applicable)

2. TEACHERS QUALIFICATIONS:-

- As prescribed by norms .
- However required number of core faculty should be given for particular course along with paper wise and Specialization wise work load allocation.
- Work load details should be as per Apex body/UGC/State Govt./University norms.

Sr. No.	Designation	Names	Area of specialization	Date of superannuation	Exp. in yrs.	Publins
1	Principal	Dr. Vidya Kurane	Zoology	28 Feb, 2008	35	4
2	Reader	Dr. Savita Dhongade.	Organic Chemistry	28 Feb 2027	18	15
3	Lecturer	Dr.L.P. Lanka	Cell-Biology & Parasitology	26 July 2029	12	3
4	Lecturer	Shri. S. P. Chavan	Inorganic Chemistry	28 Feb, 2025	20	-
5	Lecturer	Shri. A. G. Wandre.	Inorganic Chemistry	30 June 2017	18	-
6	Lecturer	Shri.P.Y. Patil	Reliability & Life Testing (Statistics)	30 June 2029	12	-
7	Lecturer	Dr.L.P. Lanka	Cell-Biology & Parasitology	26 July 2029	12	3
8	Lecturer	Shri. A. B. Gurav	Organic Chemistry	30 June 2034	12	-
9	Lecturer	Dr.P.D. Shiragave	Tissue Culture & Biotechnology	30 Nov. 2032	6	4
10	Lecturer	Mr.Narendra V. Nyayanit	Entomology	4 Nov. 2037	4	-
11	Lecturer	Smt..V.S. Khude	Plant Physiology	31 May 2041	3	2
12	Lecturer	Shri. Ramteke Avinash	Organic Chemistry			
13	Lecturer	Shri. S.R. Kulal.	Inorganic Chemistry			

3. The Board of studies should clearly mention the required Books, Journals and specific Equipments necessary for the Course.

(A) LIBRARY :

Reference and Text Books, Journals and Periodicals, Reference Books for Advanced Books for Advanced studies.

- (B) SPECIFIC EQUIPMENTS : Necessary to run the Course.
(T.V., V.C.R. V.C.P., L.C.D., Overhead Projector) (Computers and necessary softwares and operating systems etc.)
- (C) LABORATORY SAFETY EQUIPMENTS :

Syllabus Frame work - General Guidelines :-

A) i) The Board of Studies and the faculty should Pass the resolutions consistent with the powers and duties mentioned in Maharashtra Universities Act-1994 and statutes made there under.

The Board of Studies and faculties should put their efforts in bringing high standards in curriculum framework and updating the syllabi to cater to future needs of Higher Education. This should cover demanding needs of industry and Commerce, upcoming trends and developments, research strategies, interdisciplinary areas of teaching and research. The education system and the curriculum developments should be linked with career aspirations of our students.

The success of the university is judged by the quality of graduates it produces. Therefore, university should maintain the highest standard in its teaching and examination by which the student can attain and develop their capacity.

The University Grants Commission has developed model curriculum to provide a broad common frame work for exchange for mobility and free dialogue across the entire Indian academic community with a view to bring upon continuous improvement. Further the UGC looks towards advancement of knowledge industries by adding career orientation approach in course contents and syllabus framework. Likewise it focuses upon new techniques of education through cafeteria approach, credit system, internal assessment and term work, semester system, bridge courses and add on courses for soft skill development of students from placement point of view. Further it focuses upon need based research by adding the research component at under graduate and post graduate level through project work, industry-academia interaction, industrial tours and training to students etc.

Distance Education is at another mode which will help our university to increase the access of higher education to the marginalized and weaker sections of rural society and in the process will help to make university education more socially inclusive.

ii) The Chairman, Board of studies and the Deans of the faculty should check the syllabus submitted by their concerned Board as per the check list mentioned below :

- 1) Standard syllabus format should be followed for every course/paper. It should be noted that few components (given in standard format) like duration, pattern, intake capacity, fee structure, eligibility for admission etc. are applicable to syllabus framework of part –I only.
- 2) The title of papers should be unique. Repetition in titles should be avoided.
- 3) General objectives of the degree/course with specific objectives of each paper should be mentioned in the syllabi.
- 4) The structure & title of papers of the degree as a whole should be submitted at the time of submission/revision of first year syllabus.
- 5) General Instructions for laboratory safety should be added as a part of syllabi, wherever necessary
- 6) While framing the syllabus, the detailed elaboration of foundation, core and applied components alongwith advanced areas of study is essential.

It should be mentioned in detail the expected level of study of each unit or the syllabus from examination and assessment point of view.

- 7) While giving the nature of Question Paper it should be strictly mentioned that the Question paper will be set in the view of the/in accordance with the entire syllabus.
- 8) The syllabus of every Paper/Subject should be framed in accordance with UGC curriculum guidelines.
- 9) The unit wise syllabus should be framed with general pattern 8-9 units per paper covering 120 lectures workload for each paper.
- 10) The board of studies and the faculty should prepare standard document of operational manual for Laboratory safety. List of

standard Equipments required for particular course/degree programmes should also be mentioned in the said document. This will enable to streamline the university education system towards quality enhancement.

- 11) The nature of question paper should be in accordance with the common policy approved by Academic Council dated 23 -11-06 wide Item No. 9. In view of the same each question should not more than 8 marks.
- 12) The nature of question paper should be common for various courses/subjects/papers within the same faculty.
- 13) There should be a broad homogeneous frame of policy amongst the board of studies and faculty regarding nature of question paper and level of questions covering Informative, Application, subject aptitude and depth of understanding of students. The process of evaluation and assessment should give ample scope for additional marks to those students, whose answer are based on advanced level of study as evidenced for additional reading of the student.

B) GENERAL SAFETY RULES FOR LABORATORY WORK

1) List of equipments needed for Laboratory Safety:-

1. Fire extinguisher
2. First Aid Kit
3. Good earthing and insulated wirings for electrical supply.
4. Emergency exit
5. Apron and goggles wherever necessary
6. Fuming Chambers
7. Masks flows and shoes while handling hazardous chemicals & gases (Good valves, manometers and regulators for gas supply)
8. Operational manuals for instruments (handling to be made as suggested.)
9. Rules of animals and blanks ethics.
10. Leakage of gases to be avoided.
11. Cylinders or flow pipes to handle Acids.
12. No weighings for NaOH and hygroscopic substances.
13. Stabilized supply in the laboratory.

2) There Is No Substitute For Safety

1. Any injury no matter how small, it must be reported to teacher immediately.
2. a) In case any chemical enters your eyes go immediately to eye-wash facility and flush your eyes and face with large amount of water.

b) For acid or phenol spill, do not use water instead put some bicarbonate.
3. In case of fire, immediately switch off all gas connections in the laboratory and pour sand on the source of fire or cover it with asbestos or cement sheet.
4. While leaving laboratory, make sure that gas, water taps and electricity are switched off.
5. Remove your lab coat. Gloves and clean your hands before leaving laboratory.
6. Make your workplace clean before leaving the laboratory.
7. Keep your hands away from your face, while working in laboratory.
8. Each laboratory must have a first aid box.
9. Know what to do in case of emergency - e.g.
 - (a) Know the place of fire extinguisher and first aid box.
10. Don't use cell phones in the laboratory.
 - (a) Remember important phone numbers

- 3) DO's
1. Always wear lab coat, shoes in the laboratory. Every student must have their weight box, a napkin etc.
 2. Maintain separate record book for each subject.
 3. Keep your belongings at the place allotted for the same.
 4. Maintain silence, order, cleanliness and discipline in the laboratory.
 5. Work at the place allotted to you or specially used for certain operations.
 6. Keep the working table clean.
 7. Handle the laboratory equipments, glassware and chemical with great care.
 8. Use only required quantities of material and apparatus of essential size.
 9. Perform the test in their proper order.
 10. Know the location of eye wash fountain and water shower.
 11. Minimize your exposure to organic solvents.
 12. The Metal like sodium should be kept under kerosene or liquid paraffin layer in a vessel with a cork stopper.
 13. Sodium metal should be cut on dry filter paper. The cut off pieces of sodium should be immediately collected in a vessel containing kerosene or liquid paraffin.
 14. Always pour acid into water when diluting and stir slightly.
 15. All operations involving poisonous flammable gases and vapours should be carried out in the flame chamber (with exhaust facility)
 16. Ladies should avoid wearing saree. If it is there, apron is essential.

- 4) DON'T
1. Don't work alone in the laboratory
 2. Don't leave the glasswares unwashed.
 3. Don't take apparatus, chemicals out of lab.
 4. Don't leave any substance in a vessel or bottle without label.
 5. Don't weigh the reagent directly on the balance pan.
 6. Don't. throw the cut off pieces of sodium metal in sink or water. Transfer it immediately in it's container.
 7. Don't take sodium metal with hands. Use forceps.
 8. Don't panic and run in case of fire. Use the fire extinguishers or sand buckets.
 9. Don't breathe the vapours of organic solvents.
 10. Don't. pour any unused reagent back in its stock bottle.
 11. Don't eat or drink any food in laboratory.
 12. Don't use inflammable solvents like benzene, ether, chloroform, acetone and alcohol around flame.
 13. Don't distill to dryness.
 14. Don't exchange stoppers of flasks and bottles containing different reagents.
 15. Don't leave reagent bottle lying on the table.
 16. Don't disturb the order of reagent bottles in which they are placed.
 17. Don't bring reagent on your working table from the general shelf.
 18. Don't throw burning matchstick into dustbin.
 19. Don't leave the laboratory without permission.

5) LAB SAFETY PRECAUTIONS / MEASURES IN CHEMISTRY LABORATORY

Part I : Personal Precautions

1. All personnel must wear safety Goggles at all times
2. Must wear the Lab Aprons/Lab Jacket and proper shoes.
3. Except in emergency, over-hurried activities is forbidden.
4. Fume cupboard must be used whenever necessary.
5. Eating, Drinking and Smoking in the laboratories strictly forbidden.

Part II : Use of Safety and Emergency Equipments

1. First aid kits
2. Sand bucket
3. Fire exextinguishers (dry chemical and carbon dioxide extinguishers)
4. Chemical Storage cabinet with proper ventilation
5. Material Safety Date sheets.
6. Management of Local exhaust systems and Fume hoods.
7. Sign in register if using instruments.

6) LABORATORY / FIELD WORK CARE AND SAFTY FOR BOTANY AND ZOOLOGY STUDENTS

1. Unnecessary wastage of plant material / animals during practicals should be avoided.
2. During study tour / personal collection, more emphasis be given on study of plants / animals in nature and collection of wild plants and animals should not be carried out.
3. If at all the collectionof the plant material animals in needed, it should be carried out under supervision of concerned teacher. Collection of poisonous plants / poisonous mushrooms / harmful animals should be avoided.

4. Oral intake of unknown plant material / animal, out of curiosity, during practical or collection tour is strictly prohibited.
5. If there is any allergic reaction while handling the plants / plant parts / pollen grains / fungal specimens / animals it should be immediately brought to the notice of the concerned teacher and reported to the registered medical purloiner.
6. Wearing of handgloves (and mask) is essential while handling poisonous plants or animals / herbarium sheets / toxic and hazardous chemicals / reagents / stung acids / stung alkalis during the experiment should be made with vaccupipette / autopipette / burette under the supervision of concerned teacher / lab assistant.
7. Highly inflammable organic solvents (alcohol, acetone etc.) should not be kept in vicinity of spirit lamp.
8. The laboratory safety measures adopted for handling of hazardous chemicals in chemistry practicals should be followed for conducting practicals in plant biochemistry / microbiology.
9. Operational manuals for equipments such as centrifuge, autoclave, spectrophotometer should be followed.
10. In case of minor injuries, preliminary treatment should be undertaken with the help of first aid kit available in the laboratory. In case of serious injury, concerned teacher should be immediately contacted for consultation to the physician.
11. The instruction report for breeding, experimentation & dissection of animals will be submitted in a week period. (Which are laid down by Ministry of Social Justice & Empowerment and Ministry of Environment and Forests, Govt. of India)
12. Animal ethic committee should be constituted in the college where the subject Zoology is taught and the rules / norms laid down by the committee should be strictly followed while during experiment / performing dissection on animals.