

**Mata Gujri College  
Sri Fatehgarh Sahib  
(AN AUTONOMOUS COLLEGE)**

**RE-ACCREDITED BY NAAC WITH “A” GRADE**

“COLLEGE WITH POTENTIAL FOR EXCELLENCE” STATUS BY UGC

**Syllabus**

**For**

**B. Sc. Agriculture (Honors) Third Year  
(5<sup>th</sup> Semester)**



**Academic Session 2018-19 & 2019-20**

**B.Sc. Agriculture (Honors) Syllabus (5<sup>th</sup> Semester) for session 2018-2019 & 2019-20****Outline of the Syllabus for Semester-V**  
B.Sc. Agriculture (Hons.) Course (Semester System)  
**Semester-V**

Paper code	Subject	Periods per week		Marks		Internal assessment		Total marks		Grand Total
		Theory	Practical	Theory	Practical	Theory	Practical	Theory	Practical	
<b>Zoo - 501</b>	Dairying	3	1	30	25	20	0	50	25	75
<b>Stat - 502</b>	Basic Statistics	3	0	30	0	20	0	50	0	50
<b>GPB - 503</b>	Plant Breeding	3	1	30	25	20	0	50	25	75
<b>Zoo - 504</b>	Economic Zoology and Fish culture	3	1	30	25	20	0	50	25	75
<b>Agron -505</b>	Rainfed agriculture	3	1	30	25	20	0	50	25	75
<b>Hort - 506</b>	Medicinal and aromatic plants	3	1	30	25	20	0	50	25	75
<b>Path - 507</b>	Mushroom Cultivation	3	1	30	25	20	0	50	25	75
<b>Agron -508</b>	Weed management	3	1	30	25	20	0	50	25	75
<b>Total</b>		<b>24</b>	<b>7</b>	<b>240</b>	<b>200</b>	<b>160</b>	<b>0</b>	<b>400</b>	<b>175</b>	<b>575</b>

**B.Sc. AGRICULTURE (HONS.) V SEMESTER  
ZOO 501: Dairy Technology**

**Max. Marks  
(Theory + Practical): 75  
Total marks Theory: 50  
External Theory: 30  
Th. Internal assessment: 20  
Periods per week (Theory): 3**

**Instructions for the Paper Setters**

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

**Theory**

**UNIT -1**

Milk: -Definition, composition (milk fat, milk proteins, lactose and minerals) Minor constituents of milk. Factors affecting the quality and yield of milk. Physical, chemical and nutritive properties of milk. Colostrum and its composition. Market Milk: Legal standards of standard milk, toned milk, double toned milk, flavored milk, enriched milk or fortified milk, irradiated milk. Adulteration of milk and its detection. Milk processing and milk products.

**UNIT II**

Bacteriology of Milk: -Type of bacteria, acid producing and flavour producing bacteria, Multiplication, requirements for growth and source of bacteria in milk. Dairy Operations: - Straining, filtration, clarification, standardization homogenization, pasteurization and sterilization.

**Practical  
ZOO-501: Dairying**

**Total marks: 25  
Period per week : 1**

1. Organoleptic tests. COB tests.
2. Testing of milk for fat % by Gerber's methods.
3. Determination of specific gravity by lactometer.
4. Determination of T.S. and SNF by formula using fat % and lactometer.

**B.Sc. Agriculture (Honors) Syllabus (5<sup>th</sup> Semester) for session 2018-2019 & 2019-20**

5. Determination of acidity in milk to assess its suitability for heat treatments.
6. Reporting on the quality and adulteration of milk Ice cream making.
7. Preparation of flavored sterilized milk.
8. Visit to milk plant Verka and prepared assignment.

**Suggested readings**

1. Benerjee G C .2011. *A Textbook of Animal Husbandry, (Eighth Edition)* Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi
2. **Sukumar De.** 2001. *Outlines of Dairy Technology* Oxford University Press, New Delhi.
3. Modern Technology Of Milk Processing & Dairy Products (4th Edition) *2013NIIR Project Consultancy Services.*
4. **Sharma H, Pandey H & Singh C .2009.***Dairy Science and Technology and Food and Dairy Engineering, CBS Publishers and Distributers Pvt Ltd.*

**B.Sc. AGRICULTURE (HONS.) V SEMESTER**

**GPB -503: Introduction to Plant Breeding**

**Max. Marks  
(Theory + Practical): 75  
Total marks Theory: 50  
External Theory: 30  
Th. Internal assessment: 20  
Periods per week (Theory): 3**

**Instructions for the Paper Setters**

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

**Theory**

**UNIT -I**

Definition and objectives. Origin and domestication of common field crops. Role of genetics and related sciences in plant breeding. Morphology in related species of crop plants (wheat, rice, cotton, sugarcane, maize, mustard). Reproductive systems in crop plants and their relationship to breeding methods.

**UNIT-II**

Breeding methods in self and cross pollinated and vegetatively propagated crops. Heterosis, male sterility and self incompatibility and their utilization. Mutation, polyploidy, inter-specific hybridization and tissue culture in relation to crop improvement. Procedures for release of new varieties.

**Practical**

**GPB -503: Introduction to Plant Breeding**

**Total marks : 25  
Period per week : 1**

1. Study of morphological characters and floral structure of wheat, rice, cotton, sugarcane, maize, mustard.
2. Emasculation and pollination techniques in field crops.
3. Determination of pollen viability.

**Suggested Readings**

1. Allard RW. 1981. *Principles of Plant Breeding*. John Wiley & Sons.
2. Chopra VL. 2001. *Breeding Field Crops*. Oxford & IBH.
3. Chopra VL. 2004. *Plant Breeding*. Oxford & IBH.
4. Gupta SK. 2005. *Practical Plant Breeding*. Agribios.

**B.Sc. AGRICULTURE (HONS.) V SEMESTER**

**Zoo -504: Economic Zoology and Fish Culture**

**Max. Marks: 75**

**Total marks Theory: 50**

**External Theory: 30**

**Th. Internal assessment: 20**

**Periods per week (Theory): 3**

**Instructions for the Paper Setters**

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

**Theory**

**UNIT -I**

Introduction to economically important animals. Ticks and mites of agricultural importance. Conservation of useful animals. External characters, habits, habitat and importance of birds wild boar, nil gai, bats and rodents. Management practices for birds of economic importance and rodents with special reference to Punjab. Vermitechnology- importance and scope. Introduction to pisciculture –meaning and scope. Scope of inland fisheries in Punjab. Commonly cultured fishes and their culturing practices (Catla, Rohu, Mrigal, Silver carp, Grass carp and Catfish). Brakish water fishery

**UNIT –II**

Fish farming practices and Economics of fish farming (on the basis of no. of species cultured together, stocking density and pond management, water quality characteristics, fish farming practices). Introduction to Molluscan culture, Prawn culture, Pearl Oyster culture. Management or nursery rearing and stocking ponds. Induced breeding technique (Bundh breeding and hypophysation). Factors effecting induced breeding. Fishing gears, Preservation and post-harvest of fish. Integrated fish farming. Catfish culture.

**Practical**

**Zoo -504: Economic Zoology and Fish Culture**

**Total marks Practical: 25**

**Period per week (Practical): 1**

1. Study of external characters of earthworm, frog, rat, wall lizard, sparrow, pigeon, crow, parrot, mice, squirrel and monkey. Difference between rat and mouse. Feeding

**B.Sc. Agriculture (Honors) Syllabus (5<sup>th</sup> Semester) for session 2018-2019 & 2019-20**

habits earthworm, frog, rat, wall lizard, sparrow, pigeon, crow, parrot, mice, squirrel and monkey.

2. Identification of culture able fishes and their characters.
3. Visit to fish farm and GADVASU and prepare a report.
4. Study of arthropods (cockroach, aphids, jassids and thrips)-mouthparts and digestive system).

**Suggested readings**

1. Biswas K P .2004. *Industrial fisheries* Daya Publication House, New Delhi.
2. Jangi B S 1991. *Economic Zoology*, CRC, Pune.
3. Ravindranathan K R 2003 , *Economic Zoology*, Dominant Publishers and Distributers.
4. Khan A A 2007. *Encyclopedia of Economic Zoology*, Anmol Publication Pvt. Ltd.

**B.Sc. AGRICULTURE (HONS.) V SEMESTER**

**Agron -505: Rainfed Agriculture**

**Max. Marks : 75**

**Theory : 50**

**External Theory: 30**

**Th. Internal assessment: 20**

**Periods per week (Theory): 3**

**Instructions for the Paper Setters**

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

**Theory**

**UNIT-I**

Definition, problems, characteristics. Drought: Definition mechanism of drought tolerance and management practices and drought evaluation. Agro-techniques for boosting crop yields in rainfed areas. Selection of suitable crops, crop relation and crop mixture for various categories of rainfed areas.

**UNIT-II**

Moisture conservation in the field: Use of antitranspirants, mulches, wind breaks and shelter-belts. Mulch- definition, effects, types (natural and synthetic); and its merit and demerits of mulching. Weed management in rainfed areas. Water harvesting: definition and methods. Watershed management: concept, principles and practices in rainfed areas.

**Practical**

**Agron -505: Rainfed Agriculture**

**Total marks: 25**  
**Period per week: 1**

1. Selection of crops and varieties.
2. Study of different mulches.
3. Study of application of antitranspirants in crop.
4. Visit to Dry farming research stations.
5. Weed management in dryland regions.
6. Determination of moisture constants.
7. Visit to waterharvesting structure.



**Suggested readings:**

1. Gupta US. (Ed.). 1995. *Production and Improvements of Crops for Drylands*. Oxford & IBH.
2. Katyal JC & Farrington J. 1995. *Research for Rainfed Farming*. CRIDA.
3. Rao SC & Ryan J. 2007. *Challenges and Strategies of Dryland Agriculture*. Scientific Publ.
4. Singh P & Maliwal PL. 2005. *Technologies for Food Security and Sustainable Agriculture*. Agrotech Publ. Company.
5. Singh RP. 1988. *Improved Agronomic Practices for Dryland Crops*. CRIDA.

**B.Sc. AGRICULTURE (HONS.) V SEMESTER  
Hort -506: Medicinal and Aromatic Crops**

**Max. Marks: 75  
Total marks Theory: 50  
External Theory: 30  
Th. Internal assessment: 20  
Periods per week (Theory): 2**

**Instructions for the Paper Setters**

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

**Theory**

**UNIT-I**

Definition, scope, importance and constraints of medicinal and aromatic plants. Importance, origin, distribution, climate and soil requirement, propagation and nursery technique, planting, cultural practices, nutritional and water requirement, plant protection, harvesting and processing of Medicinal plants: *Dioscoria*, *Rauwolfia*, *Papaver somniferum*, *Ocimum*, *Vinca rosea*, *Cassia angustifolia*, *Aloe vera*, *Asparagus*, *Comiphorei weightii*, *Belladonna*, *Emblica officinalis*, *Plantago*, *Stevia*, *Coleus*, ashwagandha and *Acorus*.

**UNIT-II**

Importance, origin, distribution, climate and soil requirement, propagation and nursery technique, planting, cultural practices, nutritional and water requirement, plant protection, harvesting and processing of Aromatic crops – *Cymbopogon spp* (*Palmrose* and *citonella* grass), *Pelargonium graveolense*, *Rosa damascena*, *Mentha* *Vetiver zizaniodes*, *rosemary* and *lavender*.

**Practical**

**Hort -506: Medicinal and Aromatic Crops**

**Total marks : 25  
Period per week : 1**

1. Botanical description and identification of aromatic and medicinal plants.
2. Identification of medicinal plants.
3. Propagation techniques in aromatic crops.
4. Harvesting procedures of aromatic and medicinal plants.

5. Visit to processing units of aromatic & medicinal plants.
6. Visit to local aromatic and medicinal nurseries and field.

**Suggested readings**

1. Kumar N, JBM Md. , K Abdul, Rangaswami P and Irulappan I 2001 *Introduction of spices, Plantation Crops, Medicinal and Aromatic plants*, New Delhi: Oxford & IBH Publishing Co. Pvt. Ltd
2. Chadha KL and Rethiam P 1994. *Advances in Horticulture, plantation and Spice Crops* (Part 1 and 2) Malhotra Publishing House, New Delhi.
3. **Lim T K. 2016 . *Edible Medicinal and Non-Medicinal Plants* , Springer Pvt. Ltd.U.K.**
4. Zohara Y & Nativ D .2014.*Medicinal and Aromatic Plants of the Middle-East*, **Springer Pvt. Ltd.U.K.**

**B.Sc. AGRICULTURE (HONS.) V SEMESTER  
Path -507 Mushroom cultivation**

**Total marks: 75  
Theory: 50  
External Theory: 30  
Th. Internal assessment: 20  
Periods per week (Theory): 3**

**Instructions for the Paper Setters**

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

**Theory**

**UNIT -I**

Definition of mushroom its importance present scenario of mushroom cultivation general morphological features, taxonomy and identification of different mushrooms poisonous hallucinogenic and medicinal mushrooms. Pure culture of mushrooms and their nutritional requirements. Definition of spawn, substrate for spawn, types of spawn, methods of spawn production, characteristic of a good spawn, storage of spawn.

**UNIT -II**

**Cultivation of Mushroom species:** Compositing and its formulation, casting, preparation of casting mixture, sterilization, cultivation of *Agaricus*, *pleurotus*, *Volvariella*, *Lentinus* and *Auricularia*. Different types of substrates, substrate preparation and sterilization, Spawning. Identification and management of different pests and diseases of mushrooms. Methods of harvesting mushrooms, post harvest treatments and preservation of mushrooms. Nutritive value of mushrooms.

**Practical  
Path -508: Mushroom cultivation**

**Total marks: 25  
Period per week: 1**

**Practical**

- 1) Identification of common edible and poisonous mushrooms.
- 2) Equipments used in mushroom laboratory.
- 3) Physical and chemical sterilization techniques.
- 4) Preparation of culture media.
- 5) Isolation of different mushrooms in pure culture.
- 6) Preparation of spawn mother spawn and bed spawn.
- 7) Visit to a commercial spawn production unit.
- 8) Preparation of substrates for mushroom cultivation.
- 9) Button mushroom cultivation.
- 10) Post harvest treatment and preservation of mushrooms.

**Suggested readings:**

1. Stamets P & Chilton J 1985. *The Mushroom Cultivator: A Practical Guide for Growing Mushrooms*, Oxford Printing Press London.
2. *Hand Book Of Mushroom Cultivation, Processing And Packaging* ,EIRI, New Delhi.
3. Singh M, Vijay B, Kamal S and Wakchure G C (2011) *Mushrooms : Cultivation , Marketing and Consumption*, Directorate of Mushroom Research (IARI), Chambaghat , Solan, H.P. (173213).
4. Dattas V & Biswas N. 2012 .*Mushrooms: A Manual for Cultivation* PHI .

**B.Sc. AGRICULTURE (HONS.) V SEMESTER  
Agron -508 Weed Management**

**Max. Marks  
(Theory + Practical): 75  
Total marks Theory: 50  
External Theory: 30  
Th. Internal assessment: 20  
Periods per week (Theory): 3**

**Instructions for the Paper Setters**

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

**Theory**

**UNIT-I**

Weeds: Introduction, harmful and beneficial effects, classification, propagation and dissemination, Weed biology and ecology, crop weed association, crop weed competition and Allelopathy Concepts of weed prevention, control and eradication; Methods of weed control: physical, cultural, chemical and biological methods. Integrated weed management; Herbicides: advantages and limitation of herbicide usage in India, Herbicide classification, formulations, methods of application;

**UNIT-II**

Introduction to Adjuvants and their use in herbicides; Introduction to selectivity of herbicides; Compatibility of herbicides with other agro chemicals; Weed management in major field and horticultural crops.

**Practical  
Agron -508 Weed Management**

**Total marks: 25  
Period per week: 1**

1. Identification of weeds.
2. Computation of weed density in various crop field.
3. Survey of weeds in crop fields and other habitats.
4. Preparation of herbarium of weeds.
5. Calculations on weed control efficiency and weed index.
6. Herbicide Label information.

7. Computation of herbicide doses.
8. Study of herbicide application.

**Suggested Readings**

1. Aldrich RJ & Kramer RJ. 1997. *Principles in Weed Management*. Panima Publ.
2. Ashton FM & Crafts AS. 1981. *Mode of Action of Herbicides*. 2nd Ed. Wiley Inter- Science.
3. Gupta OP. 2007. *Weed Management – Principles and Practices*. Agrobios.
4. Mandal RC. 1990. *Weed, Weedicides and Weed Control - Principles and Practices*. Agro- Botanical Publ.