

B.Sc. Agriculture (Honors) Syllabus (2nd Semester) for 2018-19 & 2019-20

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) First Year

(2nd Semester)



Academic Session 2018-2019 & 2019-2020

B.Sc. Agriculture (Honors) Syllabus (2nd Semester) for 2018-19 & 2019-20**Outline of the Syllabus for Semester-II**

B.Sc. Agriculture (Hons.) Course (Semester System)

Semester-II

| Paper Code | Subject | Periods per week | | Marks | | Internal assessment | | External marks | | Grand Total |
|--------------|--|------------------|-----------|------------|------------|---------------------|-----------|----------------|------------|-------------|
| | | Theory | Practical | Theory | Practical | Theory | Practical | Theory | Practical | |
| AGRON -201 | Water Management and Micro Irrigation | 3 | 1 | 75 | 25 | 20 | 0 | 55 | 25 | 100 |
| EXTN -202 | Dimensions of Agriculture Extension | 3 | 1 | 75 | 25 | 20 | 0 | 55 | 25 | 100 |
| GPB -203 | Principles of Genetics | 3 | 1 | 75 | 25 | 20 | 0 | 55 | 25 | 100 |
| SOILS -204 | Soil Chemistry, Soil Fertility and Nutrient Management | 3 | 1 | 75 | 25 | 20 | 0 | 55 | 25 | 100 |
| HORT -205 | Vegetable Production Technology | 3 | 1 | 75 | 25 | 20 | 0 | 55 | 25 | 100 |
| PBI-208 | Punjabi Compulsory | 3 | 0 | 50 | 0 | 20 | 0 | 30 | 0 | 50 |
| EVS | Environmental Science | 3 | 0 | 100 | 0 | 25 | 0 | 75 | 0 | 100 |
| MATH-207 | Basic Mathematics-II | 4 | 0 | 75 | 0 | 30 | 0 | 45 | 0 | 75 |
| ZOO-(S) 207 | Basic Zoology | 2 | 1 | 50 | 25 | 20 | 0 | 30 | 25 | 75 |
| Comp-206 | Introduction to computer application | 2 | 1 | 50 | 25 | 20 | 0 | 30 | 25 | 75 |
| Total | | 29 | 7 | 670 | 175 | 215 | 0 | 485 | 175 | 875 |

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B.Sc. AGRICULTURE (HONS.) Semester – II

Agron- 201: Water Management and Micro Irrigation

Max. Marks: 100

Theory: 75

(External: 55+ Internal assessments: 20)

Practical: 25

Periods per Week 3+1

INSTRUCTIONS FOR THE PAPER SETTERS/CANDIDATES

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 11 marks each. Section - C will consist of 11 short answer type questions which will cover the entire syllabus uniformly and will carry one 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

1. Irrigation- definition and objectives. Water resources and irrigation development in India and Punjab.
2. Plant water relationships.
3. Crop water requirement and their determination methods.
4. Effective rainfall, mulching and criteria of scheduling irrigation.

Unit-II

1. Methods of irrigation- surface, sprinkler and drip irrigation. Irrigation efficiency.
2. Conjunctive use of water. Water management in rice, wheat, maize, cotton, groundnut
3. Water management in sugarcane, mango, banana, tomato
4. Water management in pea, potato, marigold, chrysanthemum and rose. Agricultural drainage.

Practical

Agron - 201: Water Management and Micro Irrigation

Total marks: 25

Period per week-1

1. Determination of bulk density and field capacity by field methods.
2. Determination of permanent wilting point.
3. Measurement of irrigation water through flumes and weirs.
4. Calculation of irrigation water requirement.
5. Demonstration of furrow, check basin and basin methods of irrigation.
6. Cost estimation of drip irrigation system and sprinkler system.

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7. Demonstration of filter cleaning, fertigation tank, ventury and flushing of laterals.
8. Erection and operation of sprinkler irrigation system.
9. Measurement of emitter discharge rate, wetted diameter and calculation of emitter discharge variability.
10. Visit to farmers' field.

Suggested Readings

1. Lenka D. 1999. *Irrigation and Drainage*. Kalyani.
2. Michael AM. 1978. *Irrigation: Theory and Practice*. Vikas Publ.
3. Paliwal KV. 1972. *Irrigation with Saline Water*. IARI Monograph, New Delhi.
4. Panda SC. 2003. *Principles and Practices of Water Management*. Agrobios.
5. Prihar SS & Sandhu BS. 1987. *Irrigation of Food Crops - Principles and Practices*. ICAR.
6. Reddy SR. 2000. *Principles of Crop Production*. Kalyani.
7. Singh Pratap & Maliwal PL. 2005. *Technologies for Food Security and Sustainable Agriculture*. AgrotechPubl.

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B.Sc. AGRICULTURE (HONS.) Semester – II

Extn-202: Dimensions of Agricultural Extension

Max. Marks: 100

Theory: 75

(External: 55+ Internal assessments: 20)

Practical: 25

Periods per Week 3+1

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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 11 marks each. Section - C will consist of 11 short answer type questions which will cover the entire syllabus uniformly and will carry one 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

1. Education- meaning and types.
2. Extension education and agricultural extension- meaning, objectives, principles and philosophy.
3. Importance and problems of rural development.
4. Agricultural and rural development programs of pre and post-independence era.

Unit-II

1. Powers, functions and organizational set-up of three tier Panchayati raj system.
2. New trends in extension education and privatization of extension.
3. Women development programmes.
4. Emergence of broad based extension.

Practical

Extn-202: Dimensions of Agricultural Extension

Total marks: 25

Period per week-1

1. Visit to village farmer's club, cooperative agricultural service society for preparing a report on its functioning.
2. To study the role of Panchayati raj institutions and District rural development agency in extension.
3. Self-help groups and voluntary organization.
4. Identification of the agricultural problem using participatory rural appraisal technique

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Suggested Readings:

1. S. Anil Kumar *et al* 2008 Entrepreneurship development New age international Publishers
2. G.L Ray & Sagar 2005. Entrepreneurship development for the rural development Mandal Kalayani pub.
3. Katar Singh. 2014. Rural Development Sage International Publishers
4. G.L Ray 2012. Extension communication and management Naya Prakashani.

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B.Sc. AGRICULTURE (HONS.) Semester – II
GPB-203: Principles of Genetics

Max. Marks: 100
Theory: 75
(External: 55+ Internal assessments: 20)
Practical: 25
Periods per Week 3+1

INSTRUCTIONS FOR THE PAPER SETTERS/CANDIDATES

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 11 marks each. Section - C will consist of 11 short answer type questions which will cover the entire syllabus uniformly and will carry one 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

1. Mendel's laws of inheritance. Types of gene action. Qualitative and quantitative traits.
2. Multiple factor hypothesis. Cytoplasmic inheritance. Mutations - methods of inducing mutations and detection of sex linked and autosomal mutations.
3. CIB technique. Gene expression and differential gene activation. Lac operon and fine structure of gene.
4. Ultra structure of cell and cell organelles and their functions. Study of chromosome structure, morphology, number and types. Karyotype and Idiogram, mitosis and meiosis.

Unit-II

1. DNA and its structure, function, types, modes of replication and repair. RNA and its structure, function and types.
2. Transcription. Translation-genetic code and outline of protein synthesis. Crossing over and factors affecting it. Mechanism of crossing over and cytological proof of crossing over.
3. Linkage and estimation of linkage.
4. Numerical chromosomal aberrations and evolution of different crop species like cotton, wheat, tobacco, triticales and *Brassica*. Structural chromosomal aberrations.

Practical

GPB-203: Principles of Genetics

Total marks: 25
Period per week-1

1. Microscopy- preparation and use of fixatives and stains for light microscopy.

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2. Identification of various stages of mitosis and meiosis.
3. Monohybrid, dihybrid and trihybrid ratios and their modifications.
4. Chi-square analysis and interaction of factors.
5. Epistatic factors, additive factors and inhibitory factors. Linkage- two point and three point test cross.
6. Induction of polyploidy using colchicines.
7. Induction of chromosomal aberrations using chemicals.

Suggested Readings:

1. B. D Singh 2015. Genetics Kalyani Publication
2. Phundan Singh.2013. Essential of Genetics Kalyani Publication
3. Gardner EJ & Snustad DP. 1991. *Principles of Genetics*. John Wiley & Sons.
4. B D Singh. 2014 Fundamental of Genetics. Kalyanai Publication
5. Klug WS & Cummings MR. 2003. *Concepts of Genetics*. Peterson Edu.
6. Lewin B. 2008. *Genes IX*. Jones & Bartlett Publ.
7. Russell PJ. 1998. *Genetics*. The Benzamin/Cummings Publ. Co.
8. Snustad DP & Simmons MJ. 2006. *Genetics*. 4th Ed. John Wiley & Sons.
9. Strickberger MW. 2005. *Genetics*. 3rd Ed. Prentice Hall.
10. Tamarin RH. 1999. *Principles of Genetics*. Wm. C. Brown Publs.
11. Uppal S, Yadav R, Subhadra & Saharan RP. 2005. *Practical Manual on Basic and*
12. *Applied Genetics*. Dept. of Genetics, CCS HAU, Hisar

Soils-204: Soil Chemistry, Soil Fertility and Nutrient Management

Max. Marks: 100

Theory: 75

(External: 55+ Internal assessments: 20)

Practical: 25

Periods per Week 3+1

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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 11 marks each. Section - C will consist of 11 short answer type questions which will cover the entire syllabus uniformly and will carry one 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

1. Soil as a source of plant nutrients. Essential and beneficial elements- criteria of essentiality, forms of nutrients in soil, mechanisms of nutrient transport to plants.
2. Factors affecting nutrient availability to plants. Nutrient deficiency and toxicity symptoms and their remedial measures. Problem soils- acid, salt affected and calcareous soils, characteristics, nutrient availabilities.
3. Reclamation- mechanical, chemical and biological methods. Fertilizer and their effect on soil, water and air. Irrigation water - quality of irrigation water and its appraisal. Soil fertility, approaches for soil fertility evaluation.
4. Methods of soil testing. Critical levels of different nutrients in soil.

Unit-II

1. Plant analysis- DRIS approach, critical levels in plants. Rapid tissue tests. Indicator plants. Biological methods of soil fertility evaluation.
2. Soil test based fertilizer recommendations to crops.
3. Factors influencing nutrient use efficiency (NUE) and nutrient interactions.
4. Source, method and scheduling of nutrients for different soils and crops grown under rainfed and irrigated conditions.

Practical

Soils-204: Soil Chemistry, Soil Fertility and Nutrient Management

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

1. Principles of analytical instruments and their calibration and applications.
2. Colorimetry and flame photometry.
3. Estimation of available N, P, K, S and Zn in soils.
4. Estimation of available P
5. Estimation of available K
6. Estimation of available
7. Estimation of pH
8. Estimation of electrical conductivity.
9. Lime requirement and gypsum requirement of problem soils.

Suggested Readings:

1. Brady NC & Weil RR. 2002. *The Nature and Properties of Soils*. 13th Ed. Pearson Edu.
2. Kabata-Pendias A & Pendias H. 1992. *Trace Elements in Soils and Plants*. CRC Press.
3. Kannaiyan S, Kumar K & Govindarajan K. 2004. *Biofertilizers Technology*. ScientificPubl.
4. Leigh JG. 2002. *Nitrogen Fixation at the Millennium*. Elsevier.
5. Mengel K & Kirkby EA. 1982. *Principles of Plant Nutrition*. International PotashInstitute, Switzerland.
6. Mortvedt JJ, Shuman LM, Cox FR & Welch RM. 1991. *Micronutrients in Agriculture*. 2nd Ed. SSSA, Madison.
7. Pierzinsky GM, Sims TJ & Vance JF. 2002. *Soils and Environmental Quality*. 2ndEd.CRC Press.
8. Stevenson FJ & Cole MA. 1999. *Cycles of Soil: Carbon, Nitrogen, Phosphorus, Sulphur, Micronutrients*. John Wiley & Sons.
9. Tisdale SL, Nelson SL, Beaton JD & Havlin JL. 1999. *Soil Fertility and Fertilizers*. 5thEd. Prentice Hall of India.

B.Sc. Agriculture (Honors) Syllabus (2nd Semester) for 2018-19 & 2019-20
B.Sc. AGRICULTURE (HONS.) Semester – II
Hort-205: Vegetable Production Technology

Max. Marks: 100
Theory: 75
(External: 55+ Internal assessments: 20)
Practical: 25
Periods per Week 3+1

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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 11 marks each. Section - C will consist of 11 short answer type questions which will cover the entire syllabus uniformly and will carry one 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

1. Importance of olericulture. Nutritional garden concepts.
2. Origin, classification, area, production. Package of practices of tomato, brinjal, chillies and okra,
3. Origin, classification, area, production. Package of practices of Cucurbitaceous vegetables- cucumber, ridge gourd, ash gourd, snake gourd, bottle gourd, bitter gourd and melons
4. Origin, classification, area, production. Package of practices of Cole crops - cabbage, cauliflower and knol-khol.

Unit-II

1. Package of practices of Bulb crops - onion and garlic, Beans and peas: - French beans, cluster beans, dolichos beans, peas and cowpea
2. Package of practices of Tuber crops: - potato, sweet potato, tapioca, colocasia, yams
3. Package of practices of Root crops: - carrot, radish, turnip and beet root
4. Leafy vegetables: - amaranthus, palak, methi, Perennial vegetables: - drumstick, coccinia and curry leaf.

Practical

Hort-205: Vegetable Production Technology

Total marks: 25
Period per week-1

1. Identification of important vegetable seeds and plants.
2. Raising of vegetable nurseries.

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3. Transplanting of vegetable seedlings in main field.
4. Planning and Layout of kitchen garden and maintenance.
5. Intercultural operations in vegetable field.
6. Sowing of potato, cole crops, root crops and cucurbit vegetables.
7. Seed production in vegetable crops.
8. Harvesting indices of different vegetable crops.
9. Grading and packing of vegetables.
10. To study the commercial vegetable farms.

Suggested Readings

1. Bose TK, Som G & Kabir J. (Eds.). 2002. Vegetable Crops. Naya Prokash.
2. Bose TK, Kabir J, Maity TK, Parthasarathy VA & Som MG. 2003. Vegetable Crops. Vols. I. Naya Prakash
3. Chadha KL. (Ed.). 2002. Hand Book of Horticulture. ICAR.
4. Chauhan DVS. (Ed.). 1986. Vegetable Production in India. Ram Prasad & Sons.
5. Fageria MS, Choudhary BR & Dhaka RS. 2000. Vegetable Crops: Production Technology. Vol. II.
6. Hazra P & Som MG. (Eds.). 1999. Technology for Vegetable Production and Improvement. Naya Prakash
7. Rana MK. 2008. Olericulture in India. Kalyani Publ.
8. Rana MK. 2008. Scientific Cultivation of Vegetables. Kalyani Publ.
9. Salunkhe DK & Kadam SS. (Ed.). 1998. Hand Book of Vegetable Science and Technology: Production, Composition, Storage and Processing. Marcel Dekker.
10. Singh SP. (Ed.). 1989. Production Technology of Vegetable Crops. Agril. Comm. Res. Centre.
11. Thamburaj S & Singh N. (Eds.). 2004. Vegetables, Tuber Crops and Spices. ICAR.