

# FACULTY OF AGRICULTURE & FORESTRY

## SYLLABUS

FOR

**B.SC. (HONS.) AGRICULTURE**  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)

(SEMESTER: I – VIII)

SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024  
(Only for those students who admitted in Session 2020-21)



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**GURUNANAKDEVUNIVERSITY**  
**AMRITSAR**

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**B.SC. (HONS.) AGRICULTURE SEMESTER SYSTEM  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**Scheme of B.Sc (Hons) Agriculture (Credit Based Evaluation & Grading System)  
Semester - I**

| Course No.                | Core/<br>Elective | Course Opted                             | Course Title   | L      | T      | P      | Total  |
|---------------------------|-------------------|--|--|--------|--------|--------|--------|
| AGL 101                   | C                 | Core Course-I                            | Agricultural Microbiology  | 2      | 0      | 0      | 2      |
| AGL 102                   | C                 | Core Course-II                           | Fundamentals of Genetics   | 2      | 0      | 0      | 2      |
| AGL 103                   | C                 | Core Course-III                          | Fundamentals of Soil Science   | 2      | 0      | 0      | 2      |
| AGL 104                   | C                 | Core Course-IV                           | Introduction to Forestry   | 1      | 0      | 0      | 1      |
| AGL 105                   | C                 | Core Course-V                            | Fundamentals of Agronomy   | 3      | 0      | 0      | 3      |
| AGL 106                   | C                 | Core Course-VI                           | Rural Sociology and Educational Psychology   | 2      | 0      | 0      | 2      |
| AGL 107/AGL 108           | C                 | Core Course-VII                          | Introductory Biology / Elementary Mathematics  | 1<br>2 | 0<br>0 | 0<br>0 | 1<br>2 |
| AGL 109                   | C                 | Core Course-VIII                         | Agricultural Heritage  | 1      | 0      | 0      | 1      |
| AGP 121                   | C                 | Core Course-I (Practical)                | Lab in Agricultural Microbiology   | 0      | 0      | 1      | 1      |
| AGP 122                   | C                 | Core Course-II (Practical)               | Lab in Fundamentals of Genetics  | 0      | 0      | 1      | 1      |
| AGP 123                   | C                 | Core Course-III (Practical)              | Lab in Fundamentals of Soil Science  | 0      | 0      | 1      | 1      |
| AGP 124                   | C                 | Core Course-IV (Practical)               | Lab in Introduction to Forestry  | 0      | 0      | 1      | 1      |
| AGP 125                   | C                 | Core Course-V (Practical)                | Lab in Fundamentals of Agronomy  | 0      | 0      | 1      | 1      |
| AGP 126                   | C                 | Core Course-VII (Practical)              | Lab in Introductory Biology  | 0      | 0      | 1      | 1      |
| ENL 101                   | E                 | Ability Enhancement Compulsory Course-I  | Communicative English - I  | 2      | 0      | 0      | 2      |
| PBL 121 / PBL 122 HSL 101 | E                 | Ability Enhancement Compulsory Course-II | ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ/ ਮੁੱਢਲੀ ਪੰਜਾਬੀ (In lieu of Compulsory Punjabi)/ Punjab History and Culture (1450-1716) (Special paper in lieu of Punjabi Compulsory) | 2      | 0      | 0      | 2      |
| SOA 101                   | E                 | Ability Enhancement Compulsory Course-II | Drug Abuse: Problem, Management and Prevention (Compulsory ID Course)  | 2      | 0      | 0      | 2      |
| <b>Total</b>              |                   |  |  | 23     | -      | 6      | 28     |

**ALL THEORY PAPERS HAVE 100 MARKS (MID SEMESTER MARKS :20 & END SEMESTER MARKS :80)**

**B.SC. (HONS.) AGRICULTURE SEMESTER SYSTEM  
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SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**Semester - II**

| Course No.                          | Core/<br>Elective | Course Opted                             | Course Title   | L  | T | P | Total |
|-------------------------------------|-------------------|--|--|----|---|---|-------|
| AGL 151                             | C                 | Core Course-I                            | Fundamentals of Plant Biochemistry and Biotechnology   | 2  | 0 | 0 | 2     |
| AGL 152                             | C                 | Core Course-II                           | Fundamentals of Horticulture   | 1  | 0 | 0 | 1     |
| AGL 153                             | C                 | Core Course-III                          | Soil and Water Conservation Engineering  | 1  | 0 | 0 | 1     |
| AGL154                              | C                 | Core Course-IV                           | Fundamentals of Crop Physiology  | 1  | 0 | 0 | 1     |
| AGL 155                             | C                 | Core Course-V                            | Fundamentals of Agricultural Economics   | 2  | 0 | 0 | 2     |
| AGL 156                             | C                 | Core Course-VI                           | Fundamentals of Plant Pathology  | 3  | 0 | 0 | 3     |
| AGL 157                             | C                 | Core Course-VII                          | Fundamentals of Entomology   | 3  | 0 | 0 | 3     |
| AGL 158                             | C                 | Core Course-VIII                         | Fundamentals of Agricultural Extension Education   | 2  | 0 | 0 | 2     |
| AGP 171                             | C                 | Core Course-I (Practical)                | Lab in Fundamentals of Plant Biochemistry and Biotechnology  | 0  | 0 | 1 | 1     |
| AGP 172                             | C                 | Core Course-II (Practical)               | Lab in Fundamentals of Horticulture  | 0  | 0 | 1 | 1     |
| AGP 173                             | C                 | Core Course-III (Practical)              | Lab in Soil and Water Conservation Engineering   | 0  | 0 | 1 | 1     |
| AGP 174                             | C                 | Core Course-IV (Practical)               | Lab in Fundamentals of Crop Physiology   | 0  | 0 | 1 | 1     |
| AGP 175                             | C                 | Core Course-VI (Practical)               | Lab in Fundamentals of Plant Pathology   | 0  | 0 | 1 | 1     |
| AGP 176                             | C                 | Core Course-VII (Practical)              | Lab in Fundamentals of Entomology  | 0  | 0 | 1 | 1     |
| AGP 177                             | C                 | Core Course-VIII (Practical)             | Lab in Fundamentals of Agricultural Extension Education  | 0  | 0 | 1 | 1     |
| ENL 151                             | E                 | Ability Enhancement Compulsory Course-I  | Communicative English - II   | 2  | 0 | 0 | 2     |
| PBL 131 /<br>PBL 132<br><br>HSL 101 | E                 | Ability Enhancement Compulsory Course-II | ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ/<br>ਮੁੱਢਲੀ ਪੰਜਾਬੀ<br>(In lieu of Compulsory Punjabi)/<br>Punjab History and Culture (1717-1947)<br>(Special paper in lieu of Punjabi Compulsory) | 2  | 0 | 0 | 2     |
| <b>PSL: 055</b>                     |                   |  | Human Right & Constitutional Duties (ID Course Compulsory)   | 2  | 0 | 0 | 2     |
| <b>Total</b>                        |                   |  |  | 22 | - | 7 | 28    |

**ALL THEORY PAPERS HAVE 100 MARKS (MID SEMESTER MARKS: 20 & END SEMESTER MARKS: 80)**

**B.SC. (HONS.) AGRICULTURE SEMESTER SYSTEM  
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SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**SEMESTER-III**

| Sr. No. | Course No. | Core/ Elective | Course Opted                             | Course Title   | L         | T | P        | Total     |
|---------|------------|----------------|--|--|-----------|---|----------|-----------|
| 1.      | AGL-201    | C              | Core Course-I                            | Crop Production Technology-I (Kharif Crops)            | 1         | - | -        | 1         |
| 2.      | AGL-202    | C              | Core Course-II                           | Agricultural Marketing, Trade and Prices               | 2         | - | -        | 2         |
| 3.      | AGL-203    | C              | Core Course-III                          | Agricultural finance and Co-operation                  | 2         | - | -        | 2         |
| 4.      | AGL-204    | C              | Core Course-IV                           | Agricultural Informatics                               | 1         | - | -        | 1         |
| 5.      | AGL-205    | C              | Core Course-V                            | Farm Machinery and Power                               | 1         | - | -        | 1         |
| 6.      | AGL-206    | C              | Core Course-VI                           | Production Technology for Vegetables and Spices        | 1         | - | -        | 1         |
| 7.      | AGL-207    | C              | Core Course-VII                          | Livestock and Poultry Management                       | 3         | - | -        | 3         |
| 8.      | AGL-208    | C              | Core Course-VIII                         | Statistical Methods                                    | 2         | - | -        | 2         |
| 9.      | AGL- 209   | E              | Ability Enhancement Compulsory Course-II | Disaster Management                                    | 3         | - | -        | 3         |
| 10.     | AGP-221    | C              | Core Course-I (Practical)                | Lab in Crop Production Technology-I ( Kharif Crops)    | -         | - | 1        | 1         |
| 11.     | AGP-222    | C              | Core Course-II (Practical)               | Lab in Agricultural Marketing, Trade and Prices        | -         | - | 1        | 1         |
| 12.     | AGP-223    | C              | Core Course-III (Practical)              | Lab in Agricultural finance and Co-operation           | -         | - | 1        | 1         |
| 11.     | AGP-224    | C              | Core Course-IV (Practical)               | Lab in Agricultural Informatics                        | -         | - | 1        | 1         |
| 12.     | AGP-225    | C              | Core Course-V (Practical)                | Lab in Farm Machinery and Power                        | -         | - | 1        | 1         |
| 13.     | AGP-226    | C              | Core Course-VI (Practical)               | Lab in Production Technology for Vegetables and Spices | -         | - | 1        | 1         |
| 14.     | AGP-227    | C              | Core Course-VII (Practical)              | Lab in Livestock and Poultry Management                | -         | - | 1        | 1         |
| 15.     | AGP-228    | C              | Core Course-VIII                         | Lab in Statistical Methods                             | -         | - | 1        | 1         |
|         | ESL220     |                |  | Environmental Studies (Compulsory ID Course)           | 2         |   |          |           |
|         |            |                |  | <b>Total</b>   | <b>20</b> |   | <b>8</b> | <b>28</b> |

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**B.SC. (HONS.) AGRICULTURE SEMESTER SYSTEM  
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SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**Scheme of B.Sc (Hons) Agriculture (Credit Based Evaluation & Grading System) (2020-2024)  
SEMESTER-IV**

| Sr. No | Course No.  | Core/ Elective | Course Opted                 | Course Title   | L  | T | P | Total |
|--------|---|----------------|------------------------------|--|----|---|---|-------|
| 1.     | AGL-251   | C              | Core Course-I                | Crop Production Technology-II (Rabi Crops)   | 1  | - | - | 1     |
| 2.     | AGL-252   | C              | Core Course-II               | Production technology for Ornamental Crops, MAP and Landscaping  | 1  | - | - | 1     |
| 3.     | AGL-253   | C              | Core Course-III              | Renewable energy & Green Technology  | 1  | - | - | 1     |
| 4.     | AGL254  | C              | Core Course-IV               | Problematic Soils and their Management   | 2  | - | - | 2     |
| 5.     | AGL-255   | C              | Core Course-V                | Production Technology for Fruits and Plantation crops  | 1  | - | - | 1     |
| 6.     | AGL-256   | C              | Core Course-VI               | Principles of Seed Technology  | 1  | - | - |       |
| 7.     | AGL-257   | C              | Core Course-VII              | Farming System and Sustainable Agriculture   | 1  | - | - | 1     |
| 8.     | AGL-258   | C              | Core Course-VIII             | Fundamentals of Plant Breeding   | 2  | - | - | 2     |
| 9.     | AGL-259   | C              | Core Course-IX               | Introductory Agro-meteorology and Climate Change   | 1  | - | - | 1     |
| 10.    | AGL-260   | C              | Ability Enhancement-I        | Human values and ethics  | 1  | - | - | 1     |
| 11.    | <b>(Elective-I)</b><br>AGL-261<br>AGL-262<br>AGL-263<br>AGL-264 | E              | Core Course-X                | <b>(Any one option)</b><br>Agrochemicals<br>Weed Management<br>Biopesticides & Biofertilizers<br>System Simulation and Agro-Advisory                             | 2  | - | - | 2     |
| 12.    | AGP-271   | C              | Core Course-I (Practical)    | Lab in Crop Production Technology-II (Rabi Crops)  | -  | - | 1 | 1     |
| 13.    | AGP-272   | C              | Core Course-II (Practical)   | Lab in Production technology for Ornamental Crops, MAP and Landscaping   | -  | - | 1 | 1     |
| 14.    | AGP-273   | C              | Core Course-III (Practical)  | Lab in Renewable energy & Green Technology   | -  | - | 1 | 1     |
| 15.    | AGP-274   | C              | Core Course-IV (Practical)   | Lab in Problematic Soils and their Management  | -  | - | 1 | 1     |
| 16.    | AGP-275   | C              | Core Course-V (Practical)    | Lab in Production Technology for Fruits and Plantation crops   | -  | - | 1 | 1     |
| 17.    | AGP-276   | C              | Core Course-VI (Practical)   | Lab in Principles of Seed Technology   | -  | - | 1 | 1     |
| 18.    | AGP-277   | C              | Core Course-VIII (Practical) | Lab in Fundamentals of Plant Breeding  | -  | - | 1 | 1     |
| 19.    | AGP-278   | C              | Core Course-IX (Practical)   | Lab in Introductory Agro-meteorology and Climate Change  | -  | - | 1 | 1     |
| 20.    | <b>(Elective-I)</b><br>AGP-279<br>AGP-280<br>AGP-281<br>AGP-282 | E              | Core Course-X (Practical)    | <b>(Any one option)</b><br>Lab in Agrochemicals<br>Lab in Weed Management<br>Lab in Biopesticides & Biofertilizers<br>Lab in System Simulation and Agro-Advisory | -  | - | 1 | 1     |
|        |   |                |                              | <b>Total</b>   | 14 | - | 9 | 23    |

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**SEMESTER-V**

| Sr. No. | Course No.  | Core/<br>Elective | Course Opted                | Course Title  | L         | T        | P         | TOTAL     |
|---------|---|-------------------|-----------------------------|---|-----------|----------|-----------|-----------|
| 1.      | AGL-301   | C                 | Core Course-I               | Principles of Integrated Pest and Disease Management  | 2         | -        | -         | 2         |
| 2.      | AGL-302   | C                 | Core Course-II              | Manure, Fertilizer and Soil Fertility Management  | 2         | -        | -         | 2         |
| 3.      | AGL-303   | C                 | Core Course-III             | Pests of crops and Stored Grain and Their Management  | 2         | -        | -         | 2         |
| 4.      | AGL-304   | C                 | Core Course-IV              | Diseases of Field and Horticulture Crops and their Management-I   | 2         | -        | -         | 2         |
| 5.      | AGL-305   | C                 | Core Course-V               | Crop Improvement -I(Kharif)   | 1         | -        | -         | 1         |
| 6.      | AGL-306   | C                 | Core Course-VI              | Entrepreneurship Development and Business Communication   | 1         | -        | -         | 1         |
| 7.      | AGL-307   | C                 | Core Course-VII             | Geoinformatics and Nano-Technology and Precision Farming  | 1         | -        | -         | 1         |
| 8.      | AGL-308   | C                 | Core Course-VIII            | Intellectual Property Rights  | 1         | -        | -         | 1         |
| 9.      | <b>(Elective-I)</b><br>AGL-309<br>AGL-310<br>AGL-311<br>AGL-312 | E                 | Core Course-IX              | (Any one option)<br>Protected Cultivation<br>Micro Propagation Technique<br>Landscaping<br>Hi-Tech Horticulture                             | 2         | -        | -         | 2         |
| 10.     | AGP-321   | C                 | Core Course-X               | Practical Crop Production-I<br>(Kharif Crops)   | -         | -        | 2         | 2         |
| 11.     | AGP-322   | C                 | Core Course-I (Practical)   | Lab in Principles of Integrated Pest and Disease Management   | -         | -        | 1         | 1         |
| 12.     | AGP-323   | C                 | Core Course-II (Practical)  | Lab in Manure, Fertilizer and Soil Fertility Management   | -         | -        | 1         | 1         |
| 13.     | AGP-324   | C                 | Core Course-III (Practical) | Lab in Pests of crops and Stored Grain and Their Management   | -         | -        | 1         | 1         |
| 14.     | AGP-325   | C                 | Core Course-IV (Practical)  | Lab in Diseases of Field and Horticulture Crops and their Management-I  | -         | -        | 1         | 1         |
| 15.     | AGP-326   | C                 | Core Course-V (Practical)   | Lab in Crop Improvement-I (Kharif)  | -         | -        | 1         | 1         |
| 16.     | AGP-327   | C                 | Core Course-VI (Practical)  | Lab in Entrepreneurship Development and Business Communication  | -         | -        | 1         | 1         |
| 17.     | AGP-328   | C                 | Core Course-VII (Practical) | Lab in Geoinformatics and Nano-Technology and Precision Farming   | -         | -        | 1         | 1         |
| 18.     | <b>(Elective-I)</b><br>AGP-329<br>AGP-330<br>AGP-331<br>AGP-332 | E                 | Core Course-IX (Practical)  | (Any one option)<br>Lab in Protected Cultivation<br>Lab in Micro Propagation Technique<br>Lab in Landscaping<br>Lab in Hi-Tech Horticulture | -         | -        | 1         | 1         |
|         |   |                   |                             | <b>Total</b>  | <b>14</b> | <b>-</b> | <b>10</b> | <b>24</b> |

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**B.SC. (HONS.) AGRICULTURE SEMESTER SYSTEM  
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SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024  
SEMESTER-VI**

| Sr. No. | Course No.  | Core/<br>Elective | Course Opted                 | Course Title  | L  | T | P  | Total |
|---------|---|-------------------|------------------------------|---|----|---|----|-------|
| 1.      | AGL-351   | C                 | Core Course-I                | Rainfed Agriculture and Watershed Management  | 1  | - | -  | 1     |
| 2.      | AGL-352   | C                 | Core Course-II               | Protected Cultivation and Secondary Agriculture   | 1  | - | -  | 1     |
| 3.      | AGL-353   | C                 | Core Course-III              | Diseases of Field and Horticulture Crops and their Management-II  | 2  | - | -  | 2     |
| 4.      | AGL-354   | C                 | Core Course-IV               | Post Harvest Management and Value Addition of Fruits and Vegetables   | 1  | - | -  | 1     |
| 5.      | AGL-355   | C                 | Core Course-V                | Management of Beneficial Insects  | 1  | - | -  | 1     |
| 6.      | AGL-356   | C                 | Core Course-VI               | Crop Improvement-II (Rabi)  | 1  | - | -  | 1     |
| 7.      | AGL-357   | C                 | Core Course-VII              | Principles of Organic Farming   | 1  | - | -  | 1     |
| 8.      | AGL-358   | C                 | Core Course-VIII             | Farm Management, Production and Resource Economics  | 1  | - | -  | 1     |
| 9.      | AGL-359   | C                 | Core Course-IX               | Principles of Food Science and Nutrition  | 2  | - | -  | 2     |
| 10.     | <b>(Elective-III)</b><br>AGL-360<br>AGL-361<br>AGL-362<br>AGL-363 | E                 | Core Course-X                | (Any one option)<br>Agri-Business Management<br>Commercial Plant Breeding<br>Food Safety and Standards<br>Agricultural Journalism                             | 2  | - | -  | 2     |
| 11.     | AGP-371   | C                 | Core Course-XI               | Lab in Practical Crop Production-II ( <i>Rabi</i> )   | -  | - | 2  | 2     |
| 12.     | AGP-372   | C                 | Core Course-I (Practical)    | Lab in Rainfed Agriculture and Watershed Management   | -  | - | 1  | 1     |
| 13.     | AGP-373   | C                 | Core Course-II (Practical)   | Lab in Protected Cultivation and Secondary Agriculture  | -  | - | 1  | 1     |
| 14.     | AGP-374   | C                 | Core Course-III (Practical)  | Lab in Diseases of Field and Horticulture Crops and their Management-II   | -  | - | 1  | 1     |
| 15.     | AGP-375   | C                 | Core Course-IV (Practical)   | Lab in Post Harvest Management and Value Addition of Fruits and Vegetables  | -  | - | 1  | 1     |
| 16.     | AGP-376   | C                 | Core Course-V (Practical)    | Lab in Management of Beneficial Insects   | -  | - | 1  | 1     |
| 17.     | AGP-377   | C                 | Core Course-VI (Practical)   | Lab in Crop Improvement –II (Rabi)  | -  | - | 1  | 1     |
| 18.     | AGP-378   | C                 | Core Course-VII (Practical)  | Lab in Principles of Organic Farming  | -  | - | 1  | 1     |
| 19.     | AGP-379   | C                 | Core Course-VIII (Practical) | Lab in Farm Management, Production and Resource Economics   | -  | - | 1  | 1     |
| 20.     | <b>(Elective-III)</b><br>AGP-380<br>AGP-381<br>AGP-382<br>AGP-383 | E                 | Core Course-X (Practical)    | (Any one option)<br>Lab in Agri-business Management<br>Lab in Commercial Plant Breeding<br>Lab in Food Safety and Standards<br>Lab in Agricultural Journalism | -  | - | 1  | 1     |
|         |   |                   |                              | <b>Total</b>  | 13 | - | 11 | 24    |

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**SEMESTER VII**

**Rural Agricultural Work Experience and Agro-Industrial Attachment (RAWA & AIA)**

| Sr. No. | Course Code | Training Components   | Number of weeks |
|---------|-------------|---|-----------------|
| 1.      | AGE-401     | General orientation & on Campus training by different faculties.  | 1               |
| 2.      | AGP-421     | Plant Clinic<br>(ENTO+PPATH+HORT+AGRON+SSAC)  | 2               |
| 3.      | AGE-402     | Research Station/KVK/ including village attachment and <i>In-situ</i> interaction of farmers, students and research station scientists. | 8               |
|         |             | Unit attachment in KVK/Research station   | 5               |
| 4.      | AGE-403     | Agro-Industrial Attachment  | 3               |
| 5.      | AGD         | Project Report Preparation and Evaluation   | 1               |
|         |             | <b>Total</b>  | <b>20</b>       |

**Scheme of B.Sc (Hons) Agriculture (Credit Based Evaluation & Grading System)**



**B.SC. (HONS.) AGRICULTURE SEMESTER SYSTEM  
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**SEMESTER VIII**

**Experiential Learning Programmes**

**Modules for skill development and entrepreneurship.** A student has to register for two modules from the following package of modules: (Any two)

| <b>Sr. No.</b> | <b>Course Code</b> | <b>Experiential Learning Modules/</b>               | <b>Credits</b> |
|----------------|--------------------|---|----------------|
|                |                    | <b>Any two of the following options: -</b>          |                |
|                | AGP-451            | Production Technology Bio-agents and Bio-fertilizer | 10             |
|                | AGP-452            | Mushroom Cultivation Technology                     | 10             |
|                | AGP-453            | Soil, Plant, Water and Seed Testing                 | 10             |
|                | AGP-454            | Commercial Beekeeping                               | 10             |
|                | AGP-455            | Floriculture and Landscaping                        | 10             |
|                | AGP-456            | Commercial Horticulture                             | 10             |
|                | AGP-457            | Food Processing                                     | 10             |
|                | AGP-458            | Organic Production Technology                       |                |
|                |                    | <b>Total</b>  |                |

B.SC. (HONS.) AGRICULTURE SEMESTER-I  
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SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-101: Agricultural Microbiology**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

Introduction. Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, chemoautotrophy, photo autotrophy, growth. Genetic recombination- transformation, conjugation and transduction, plasmids, transposons.

**Section-B:**

Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and sulphur cycles.

**Section-C:**

Biological nitrogen fixation- symbiotic, associative and aysmbiotic. *Azolla*, blue green algae and mycorrhiza. Rhizosphere and phyllosphere.

**Section-D:**

Microbes in human welfare: silage production, biofertilizers, biopesticides, biofuel production and biodegradation.

B.SC. (HONS.) AGRICULTURE SEMESTER-I  
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SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-102: Fundamentals of Genetics**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity. Architecture of chromosome; chromonemata, chromomeres, centromere, secondary constriction and telomere; special types of chromosomes. Chromosomal theory of inheritance. Cell cycle and cell division- mitosis and meiosis. Probability and Chi-square. Dominance relationships, Epistatic interactions with example

**Section-B:**

Multiple alleles, pleiotropism and pseudoalleles. Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanisms, chromosome mapping.

**Section-C:**

Structural and numerical variations in chromosomes and their implications, Mutation, classification, methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation. Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance. Genetic disorders.

**Section-D:**

Nature, structure & replication of genetic material. Protein synthesis, transcription and translational mechanism of genetic material, Gene concept: Gene structure, function and regulation, Lac and Trp operons.

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**AGL-103: Fundamentals of Soil Science**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

Soil as a natural body, Pedological and edaphological concepts of soil; Soil genesis: soil forming rocks and minerals; weathering, processes and factors of soil formation; Soil Profile, components of soil;

**Section-B:**

Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity; soils of India; Soil water retention, movement and availability;

**Section-C:**

Soil air, composition, gaseous exchange, problem and plant growth; source, amount and flow of heat in soil; soil temperature and plant growth; Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability;

**Section-D:**

Soil colloids - inorganic and organic; silicate clays: constitution and properties; soil organic matter: composition, properties and its influence on soil properties; soil organisms: macro and micro-organisms, their beneficial and harmful effects;.

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**AGL-104: Introduction to Forestry**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

Introduction – definitions of basic terms related to forestry, objectives of silviculture, forest classification, salient features of Indian Forest Policies. Forest regeneration, Natural regeneration - natural regeneration from seed and vegetative parts, coppicing, pollarding, root suckers;

**Section-B:**

Artificial regeneration – objectives, choice between natural and artificial regeneration, essential preliminary considerations. Crown classification. Tending operations – weeding, cleaning, thinning – mechanical, ordinary, crown and advance thinning. Forest mensuration – objectives, diameter measurement, instruments used in diameter measurement; Non instrumental methods of height measurement - shadow and single pole method;

**Section-C:**

Instrumental methods of height measurement - geometric and trigonometric principles, instruments used in height measurement; tree stem form, form factor, form quotient, measurement of volume of felled and standing trees, age determination of trees.

**Section-D:**

Agroforestry – definitions, importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country, shifting cultivation, taungya, alley cropping, wind breaks and shelter belts, home gardens. Cultivation practices of two important fast growing tree species of the region.

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**AGL-105: Fundamentals of Agronomy**

**Time: 3 Hours**

**Credit 3-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

Agronomy and its scope, seeds and sowing, tillage and tilth, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency,

**Section-B:**

Water resources, soil plant water relationship, crop water requirement, water use efficiency, irrigation- scheduling criteria and methods, quality of irrigation water, water logging.

**Section-C:**

Weeds- importance, classification, crop weed competition, concepts of weed management- principles and methods, herbicides- classification, selectivity and resistance, allelopathy.

**Section-D:**

Growth and development of crops, factors affecting growth and development, plant ideotypes, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

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**AGL-106: Rural Sociology & Educational Psychology**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

Sociology and Rural sociology: Definition and scope, its significance in agriculture extension.

**Section-B:**

Rural society, Social Groups, Social Stratification, Culture concept, Social Institution, Social Change & Development.

**Section-C:**

Educational psychology: Meaning & its importance in agriculture extension. Behavior: Cognitive, affective, psychomotor domain.

**Section-D:**

Personality, Learning, Motivation, Theories of Motivation, Intelligence

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**AGL-107:**  
**Time: 3 Hours**

**Introductory Biology**

**Credit 1-0-0**  
**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Structure of animal and plant cell, cell division: mitosis & meiosis, Functions of cell organelles.

**Section-B**

Binomial nomenclature, classification and general survey of animal kingdom, Functional organization of various systems of a mammal.

**Section-C**

Classification of plant Kingdom with salient features of each group.

**Section-D**

Characteristics & economic importance of Brassicaceae, cruciferae, Leguminosae, Malvaceae, Fabaceae and Poaceae.



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**AGL-108: Elementary Mathematics**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

**Straight lines :** Distance formula, section formula (internal and external division), Equation of co-ordinate axes, Equation of lines parallel to axes, Slope-intercept form of equation of line, Slope-point form of equation of line, Two point form of equation of line,

**Section--B**

Intercept form of equation of line, Normal form of equation of line, General form of equation of line, Point of intersection of two straight lines, Angles between two straight lines, Parallel lines, Perpendicular lines.

**Section--C**

**Circle:** Equation of circle whose centre and radius is known, General equation of a circle, Equation of circle passing through three given points, Equation of circle whose diameters is line joining two points  $(x_1, y_1)$  &  $(x_2, y_2)$ .

**Section--D**

Definition of function, limit and continuity (of algebraic functions)

**Differential Calculus:** Differentiation of algebraic functions, exponential functions and logarithmic differentiation (excluding trigonometric functions). Derivative of sum, difference, product and quotient of two functions.

**Integral Calculus :** *Integration of Product of two functions, Integration by substitution method, Definite Integrals (of algebraic functions).*

**Matrix:** Definition of Matrices, Addition, Subtraction, Multiplication, Transpose of matrix up to 3<sup>rd</sup> order.

**Determinants:** Properties of determinants and their evaluation, Inverse of matrix up to 3<sup>rd</sup> order. Matrix method.

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**AGL-109:**

**Agricultural Heritage**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

Introduction of Indian agricultural heritage; Ancient agricultural practices, Relevance of heritage to present day agriculture;

**Section-B:**

Past and present status of agriculture and farmers in society; Journey of Indian agriculture and its development from past to modern era; Plant production and protection through indigenous traditional knowledge;

**Section-C:**

Crop voyage in India and world; Agriculture scope; Importance of agriculture and agricultural resources available in India; Crop significance and classifications;

**Section-D:**

National agriculture setup in India; Current scenario of Indian agriculture; Indian agricultural concerns and future prospects.

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ENL-101

## COMMUNICATIVE ENGLISH-I

Credits: 2-0-0

Total Marks-100

Mid Semester Examination: 20% weightage

End Semester Examination: 80% weightage

**Instructions for the Paper Setters:-**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Objective:** To introduce students to the skills and strategies of reading and writing by identifying organizational patterns, spotting classification systems and understanding associations between ideas. This course will prepare students to read a variety of texts and also to communicate more effectively through writing. The course will also pay special attention to vocabulary building.

**Prescribed Text books:**

- *The Written Word* by Vandana R. Singh, Oxford University Press, New Delhi.
- *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

**Section-A**

“Word List”, “Correct Usage of Commonly used words and Phrases” from the chapter “Vocabulary” given in *The Written Word* by Vandana R. Singh.

**Section-B**

Letter- writing as prescribed in *The Written Word* by Vandana R. Singh.  
Report writing as prescribed in *The Written Word* by Vandana R. Singh.

**Section-C**

Section 1 from *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

**Section-D**

Section 2 from *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

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**PBL 121 : ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ - I**

ਸਮਾਂ : 3 ਘੰਟੇ

ਕਰੈਡਿਟ : 2

ਕੁਲ ਅੰਕ : 50

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਸੈਕਸ਼ਨ-ਏ**

- I. **ਸਰਵੋਤਮ ਪੰਜਾਬੀ ਸਾਹਿਤ** (ਸੰਪਾ. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਡਾ. ਮੇਘਾ ਸਲਵਾਨ)  
ਕਵਿਤਾ ਭਾਗ : 1-4 ਕਵੀ  
(ਕਵੀ ਦਾ ਜੀਵਨ, ਕਵਿਤਾ-ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਾਵਿ-ਕਲਾ)
- II. ਗੁਰਮੁਖੀ ਔਰਥੋਗਰਾਫੀ ਦੀ ਜੁਗਤ (ਪੈਂਤੀ, ਮੁਹਾਰਨੀ, ਬਿੰਦੀ, ਟਿੱਪੀ ਤੇ ਅੱਧਕ); ਵਿਸਰਾਮ ਚਿੰਨ੍ਹ, ਸਬਦ ਜੋੜ (ਸ਼ੁਧ-ਅਸ਼ੁਧ)

**ਸੈਕਸ਼ਨ-ਬੀ**

- I. **ਸਰਵੋਤਮ ਪੰਜਾਬੀ ਸਾਹਿਤ** (ਸੰਪਾ. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਡਾ. ਮੇਘਾ ਸਲਵਾਨ)  
ਕਵਿਤਾ ਭਾਗ : 5-8 ਕਵੀ  
(ਕਵੀ ਦਾ ਜੀਵਨ, ਕਵਿਤਾ-ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਾਵਿ-ਕਲਾ)
- II. ਲੇਖ ਰਚਨਾ (ਜੀਵਨੀ-ਪਰਕ, ਸਮਾਜਕ ਅਤੇ ਚਲੰਤ ਵਿਸ਼ਿਆਂ ਉੱਤੇ) : 10 ਲੇਖ ਲਿਖਵਾਉਣੇ  
(ਕਲਾਸ ਵਿੱਚ ਅਤੇ ਘਰ ਲਈ ਅਭਿਆਸ)

**ਸੈਕਸ਼ਨ-ਸੀ**

- I. **ਸਰਵੋਤਮ ਪੰਜਾਬੀ ਸਾਹਿਤ** (ਸੰਪਾ. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਡਾ. ਮੇਘਾ ਸਲਵਾਨ)  
ਕਹਾਣੀ ਭਾਗ : 1-4 ਕਹਾਣੀਆਂ  
(ਕਹਾਣੀ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ, ਸਾਰ, ਕਹਾਣੀ-ਕਲਾ)
- II. ਸ਼ੁੱਧ, ਅਸ਼ੁੱਧ : ਦਿੱਤੇ ਪੈਰ੍ਹੇ ਵਿੱਚੋਂ ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨਾ  
(15 ਪੈਰ੍ਹਿਆਂ ਦੇ ਸ਼ੁੱਧ ਅਸ਼ੁੱਧ ਅਭਿਆਸ ਕਰਵਾਉਣੇ)

**ਸੈਕਸ਼ਨ-ਡੀ**

- I. **ਸਰਵੋਤਮ ਪੰਜਾਬੀ ਸਾਹਿਤ** (ਸੰਪਾ. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਡਾ. ਮੇਘਾ ਸਲਵਾਨ)  
ਕਹਾਣੀ ਭਾਗ : 5-8 ਕਹਾਣੀਆਂ  
(ਕਹਾਣੀ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ, ਸਾਰ, ਕਹਾਣੀ-ਕਲਾ)
- II. ਅਖਬਾਰੀ ਇਸ਼ਤਿਹਾਰ : ਨਿੱਜੀ, ਦਫ਼ਤਰੀ ਤੇ ਸਮਾਜਕ ਗਤੀਵਿਧੀਆਂ ਨਾਲ ਸੰਬੰਧਤ

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**ਸਹਾਇਕ ਪੁਸਤਕਾਂ**

1. ਰਾਜਿੰਦਰਪਾਲ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਕਵਿਤਾ ਦਾ ਇਤਿਹਾਸ, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ।
2. ਬ੍ਰਹਮਜਗਦੀਸ਼ ਸਿੰਘ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਾਵਿ ਸਿਧਾਂਤ, ਇਤਿਹਾਸ ਅਤੇ ਪ੍ਰਵਿਰਤੀਆਂ, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਂਡੇਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
3. ਬਲਦੇਵ ਸਿੰਘ ਧਾਲੀਵਾਲ, ਪੰਜਾਬੀ ਕਹਾਣੀ ਦਾ ਇਤਿਹਾਸ, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ।
4. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਪੰਜਾਬੀ ਕਹਾਣੀ ਦਾ ਸਫ਼ਰ ਤੇ ਸ਼ਾਸਤ੍ਰ ਭਾਗਾਂ, ਸਿੰਘ ਬ੍ਰਦਰਜ਼, ਅੰਮ੍ਰਿਤਸਰ।
5. ਹਰਕੀਰਤ ਸਿੰਘ ਤੇ ਗਿਆਨੀ ਲਾਲ ਸਿੰਘ, ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਣ, ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ, ਚੰਡੀਗੜ੍ਹ।
6. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਸਿਧਾਂਤ ਤੇ ਵਿਹਾਰ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ।
7. ਮਿੰਨੀ ਸਲਵਾਨ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਮੁੱਢਲੇ ਸੰਕਲਪ, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
8. ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਬੋਧ, ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸੰਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ।

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**PBL-122 : ਮੁੱਢਲੀ ਪੰਜਾਬੀ**  
(In lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ

ਕਰੈਡਿਟ : 2

ਕੁਲ ਅੰਕ : 50

Mid Semester Examination: 20% weightage

End Semester Examination: 80% weightage

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਸੈਕਸ਼ਨ-ਏ**

ਪੈਂਤੀ ਅੱਖਰੀ : ਅੱਖਰ ਕ੍ਰਮ, ਮਾਤ੍ਰਾਵਾਂ  
(ਮੁੱਢਲੀ ਜਾਣ-ਪਛਾਣ)

ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) : ਪਛਾਣ ਤੇ ਵਰਤੋਂ

**ਸੈਕਸ਼ਨ-ਬੀ**

ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਮੁੱਢਲੀ ਜਾਣ-ਪਛਾਣ  
ਸਾਧਾਰਨ ਸ਼ਬਦ, ਸੰਯੁਕਤ ਸ਼ਬਦ, ਮਿਸ਼ਰਤ ਸ਼ਬਦ  
ਮੂਲ ਸ਼ਬਦ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ

**ਸੈਕਸ਼ਨ-ਸੀ**

ਸ਼ੁੱਧ ਅਸ਼ੁੱਧ : ਦਿੱਤੇ ਪੈਰ੍ਹੇ ਵਿੱਚੋਂ ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨਾ  
ਸਮਾਨਾਰਥਕ ਤੇ ਵਿਰੋਧਾਰਥਕ ਸ਼ਬਦ

**ਸੈਕਸ਼ਨ-ਡੀ**

ਹਫ਼ਤੇ ਦੇ ਸੱਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰ੍ਹਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁੱਤਾਂ ਦੇ ਨਾਂ,  
ਇਕ ਤੋਂ ਸੌ ਤੱਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂ ਵਿੱਚ

**ਸਹਾਇਕ ਪੁਸਤਕਾਂ**

1. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਸਿਧਾਂਤ ਅਤੇ ਵਿਹਾਰ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ।
2. ਮੁੱਢਲੀ ਪੰਜਾਬੀ, ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸੰਨਜ਼, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
3. ਮਿੰਨੀ ਸਲਵਾਨ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਮੁੱਢਲੇ ਸੰਕਲਪ, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

B.SC. (HONS.) AGRICULTURE SEMESTER-I  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**HSL-101 : PUNJAB HISTORY AND CULTURE (1450-1716)**  
(Special paper in lieu of Punjabi Compulsory)

**Credits: 2-0-0**

**Mid Semester: 20 Marks**

**End Semester: 80 Marks**

**Mid Semester Examination: 20% Weightage**

**End Semester Examination: 80% Weightage**

**Instructions for the Paper Setters**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**SECTION-A**

1. Land and the People.
2. Bhakti Movement

**SECTION-B**

3. Life and Teaching of Guru Nanak Dev.
4. Contribution of Guru Angad Dev, Guru Arjun Dev, Guru Amar Das and Guru Ram Das.

**SECTION-C**

5. Guru Hargobind.
6. Martyrdom of Guru Teg Bahadur

**SECTION-D**

7. Guru Gobind Singh and the Khalsa.
8. Banda Singh Bahadur: Conquests and Execution.

**Suggested Reading**

1. Kirpal Singh(ed.), *History and Culture of the Punjab, Part-ii, Punjabi University, Patiala, 1990.*
2. Fauja Singh (ed.), *History of Punjab, Vol, III Punjabi University, Patiala, 1987.*
3. J.S. Grewal, *The Sikhs of the Punjab, Cup, Cambridge, 1991.*
4. Khushwant Singh, *A History of the Sikhs, Vol. I, OUP, New Delhi, 1990*

B.SC. (HONS.) AGRICULTURE SEMESTER-I  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-121:**

**Lab in Agricultural Microbiology**

**Credit 0-0-1**

Introduction to microbiology laboratory and its equipments; Microscope- parts, principles of microscopy, resolving power and numerical aperture. Methods of sterilization. Nutritional media and their preparations. Enumeration of microbial population in soil- bacteria, fungi, actinomycetes. Methods of isolation and purification of microbial cultures. Isolation of *Rhizobium* from legume root nodule. Isolation of *Azotobacter* from soil. Isolation of *Azospirillum* from roots. Staining and microscopic examination of microbes



B.SC. (HONS.) AGRICULTURE SEMESTER-I  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-122:**

**Lab in Fundamentals of Genetics**

**Credit 0-0-1**

Study of microscope. Study of cell structure. Mitosis and Meiosis cell division. Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross, Experiments on epistatic interactions including test cross and back cross, Experiments on probability and Chi-square test. Determination of linkage and cross-over analysis (through two point test cross and three point test cross data). Study on sex linked inheritance in *Drosophila*. Study of models on DNA and RNA structures.

B.SC. (HONS.) AGRICULTURE SEMESTER-I  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-123:**

**Lab in Fundamentals of Soil Science**

**Credit 0-0-1**

Study of soil profile in field. Study of soil sampling tools, collection of representative soil sample, its processing and storage. Study of soil forming rocks and minerals. Determination of soil density, moisture content and porosity. Determination of soil pH and electrical conductivity. Study of soil map. Determination of soil colour. Estimation of organic matter content of soil.

B.SC. (HONS.) AGRICULTURE SEMESTER-I  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-124:**

**Lab in Introduction to Forestry**

**Credit 0-0-1**

Identification of tree-species. Diameter measurements using calipers and tape, diameter measurements of forked, buttressed, fluted and leaning trees. Height measurement of standing trees by shadow method, single pole method and hypsometer. Volume measurement of logs using various formulae. Nursery lay out, seed sowing, vegetative propagation techniques. Forest plantations and their management. Visits of nearby forest based industries.

B.SC. (HONS.) AGRICULTURE SEMESTER-I  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-125:**

**Lab in Fundamentals of Agronomy**

**Credit 0-0-1**

Identification of crops, seeds, fertilizers, pesticides and tillage implements, Effect of sowing depth on germination and seedling vigour, Identification of weeds in crops, Methods of herbicide and fertilizer application, Study of yield contributing characters and yield estimation, Seed germination and viability test, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Use of tillage implements-reversible plough, one way plough, harrow, leveler, seed drill, Study of soil moisture measuring devices, Measurement of field capacity, bulk density and infiltration rate, Measurement of irrigation water.

B.SC. (HONS.) AGRICULTURE SEMESTER-I  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-126:**

**Lab in Introductory Biology**

**Credit 0-0-1**

Morphology of flowering plants – root, stem and leaf and their modifications. Inflorescence, flower and fruits. Cell, tissues & cell division. Internal structure of root, stem and leaf. Study of specimens and slides. Description of plants - Brassicaceae, Fabaceae and Poaceae.

B.SC. (HONS.) AGRICULTURE SEMESTER-II  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-151: Fundamentals of Plant Biochemistry and Biotechnology**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

Importance of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate: Importance and classification. Structures of Monosaccharides, Structure of Disaccharides and Polysaccharides. Lipid: Importance and classification. Proteins: Importance of proteins and classification; Structures, zwitterions, nature of amino acids; Structural organization of proteins. Enzymes: General properties; Classification; Mechanism of action.

**Section-B:**

Nucleic acids: Importance and classification; Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure. Metabolism of carbohydrates: Glycolysis, TCA cycle, Electron transport chain. Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids.

**Section-C:**

Concepts and applications of plant biotechnology: embryo culture, anther culture, pollen culture and ovule culture and their applications; Micro-propagation methods; organogenesis and embryogenesis, Synthetic seeds and their significance; somatic hybridization and cybrids;

**Section-D:**

Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and *Agrobacterium* mediated gene transfer methods; PCR techniques and its applications;

B.SC. (HONS.) AGRICULTURE SEMESTER-II  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-152:**  
**Time: 3 Hours**

**Fundamentals of Horticulture**

**Credit 1-0-0**  
**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification; principles of orchard establishment; climate and soil for horticultural crops;

**Section-B:**

Plant propagation-methods and propagating structures; Seed dormancy, Seed germination,

**Section-C:**

Principles and methods of training and pruning, juvenility and flower bud differentiation; unfruitfulness; pollination, pollinizers and pollinators; fertilization and parthenocarpy; medicinal and aromatic plants;

**Section-D:**

Importance of plant bio-regulators in horticulture. Irrigation – methods, Fertilizer application in horticultural crops.

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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-153                      Soil and Water Conservation Engineering**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

- 1) Soil Erosion Principles.
- 2) Erosivity and Erodibility
- 3) Factors affecting water erosion
- 4) Types of water erosion (Raindrop, sheet, rill and gully erosion)

**Section-B:**

- 5) Gully classification
- 6) Gully control measures

**Section-C:**

- 7) Factors affecting wind erosion
- 8) Wind erosion control measures (wind breaks and shelter belts)

**Section-D:**

- 9) Universal Soil loss Equation for water erosion
- 10) Conservation measure for hill slopes
- 11) Conservation measures for agricultural lands



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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-154**  
**Time: 3 Hours**

**Fundamentals of Crop Physiology**

**Credit 1-0-0**  
**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview; Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology;

**Section-B:**

Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms;

**Section-A:**

Photosynthesis: Light and Dark reactions, C<sub>3</sub>, C<sub>4</sub> and CAM plants; Respiration: Glycolysis, TCA cycle and electron transport chain;

**Section-D:**

Plant growth regulators: Physiological roles and agricultural uses, Physiological aspects of growth and development of major crops: Growth analysis, Role of Physiological growth parameters in crop productivity.

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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-155: Fundamentals of Agricultural Economics**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks : 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A:**

Basic concepts: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare. Agricultural economics: meaning, importance role of Agriculture in economic development. Agricultural planning and development in the country. Population: Malthusian theory, Elements of economic planning.

**Section-B:**

*Demand:* meaning, law of demand, schedule and demand curve, determinants, utility theory; law of diminishing marginal utility, equi-marginal utility principle. Consumer's equilibrium and derivation of demand curve, concept of consumer surplus. Elasticity of demand: concept and measurement of price elasticity, income elasticity and cross elasticity.

**Section-C:**

Production: input output relationship. *Laws of returns:* Law of variable proportions and law of returns to scale. *Cost:* concepts, short run and long run cost curves. Supply: Stock v/s supply, law of supply, schedule, supply curve, determinants of supply, elasticity of supply. Market structure: meaning and types of market, basic features of perfectly competitive and imperfect markets. Price determination under perfect competition; short run and long run equilibrium of firm and industry,

**Section-D:**

*National income:* Meaning concepts of national income approaches to measurement, difficulties in measurement. Money: Barter system of exchange and its problems, meaning and functions of money, classification of money, Agricultural and public finance: micro v/s macro finance, need for agricultural finance, public revenue and public expenditure. *Tax:* meaning, direct and indirect taxes, agricultural taxation, socialistic and mixed economies,

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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-156: Fundamentals of Plant Pathology**

**Time: 3 Hours**

**Credit 3-0-0**

**Marks : 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Introduction: Importance of plant diseases, scope and objectives of Plant Pathology. History of Plant Pathology with special reference to Indian work. Terms and concepts in Plant Pathology and Pathogenesis. Causes / factors affecting disease development: disease triangle and tetrahedron and classification of plant diseases. Important plant pathogenic organisms, different groups: fungi, bacteria, fastidious vascular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them. Diseases and symptoms due to abiotic causes.

**Section-B**

Fungi: general characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction (asexual and sexual). Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to divisions, sub-divisions, orders and classes. Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction. Viruses: nature, structure, replication and transmission. Study of phanerogamic plant parasites.

**Section-C**

Growth and reproduction of plant pathogens. Liberation/dispersal and survival of plant pathogens. Types of parasitism and variability in plant pathogens. Pathogenesis. Role of enzymes, toxins and growth regulators in disease development. Defense mechanism in plants.

**Section-D**

Epidemiology: Factors affecting disease development. Principles and methods of plant disease management. Nature, chemical combination, classification, mode of action and formulations of fungicides and antibiotics.

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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

AGL-157

**Fundamentals of Entomology**

Time: 3 Hours

Credit 3-0-0

Marks: 100

Mid Semester Marks: 20

End Semester Marks: 80

Mid Semester Examination: 20% weightage

End Semester Examination: 80% weightage

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

History of Entomology in India. Classification of phylum Arthropoda upto classes. Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta upto Orders, Special emphasis to orders and families of Agricultural importance like **Orthoptera**: Acrididae, Tettigonidae, Gryllidae; **Dictyoptera**: Mantidae, Blattidae; **Odonata**; **Isoptera**: Termitidae; **Thysanoptera**: Thripidae; **Hemiptera**: Pentatomidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae; **Neuroptera**: Chrysopidae; **Lepidoptera**: Pieridae, Noctuidae, Pyralidae, Gelechiidae, Arctiidae, Bombycidae; **Coleoptera**: Coccinellidae, Chrysomelidae, Curculionidae, Bruchidae; **Hymenoptera**: Tenthredinidae, Apidae. Trichogrammatidae, Ichneumonidae, Braconidae; **Diptera**: Cecidomyiidae, Culicidae, Muscidae, Tephritidae.

**Section-B**

Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure and modifications of insect antennae, mouth parts, legs, Wing modifications and wing coupling apparatus. Structure of male and female genital organ. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous and reproductive system in insects. Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptor.

**Section-C**

Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors—temperature, moisture, humidity, rainfall, light. Effect of biotic factors – food competition, natural and environmental resistance. Major points related to dominance of class Insecta in Animal kingdom. Various categories of pests.

**Section-D**

Concept of IPM, Practices, scope and limitations of IPM. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Chemical control- importance, hazards and limitations. Recent methods of pest control, repellents, antifeedants, hormones, attractants, gamma radiation. Insecticides Act 1968- Important provisions. Symptoms of poisoning, first aid and antidotes.

B.SC. (HONS.) AGRICULTURE SEMESTER-II  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-158                      Fundamentals of Agricultural Extension Education**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Education: Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education; Extension Programme planning- Meaning, Process, Principles and Steps in Programme Development. Extension systems in India:

**Section-B**

Extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era (Etawah Pilot Project, Nilokheri Experiment, etc.); various extension/ agriculture development programmes launched by ICAR/Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND, NATP, NAIP etc.), New trends in agriculture extension, cyber extension/e-extension, expert system etc. Rural Development: concept, meaning, definition; Community Dev.-meaning, definition, concept & principles.

**Section-C**

Philosophy of C.D. Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: extension teaching methods: meaning, classification, individual, group and mass contact methods.

**Section-D**

Principles and Functions of Communication, models and barriers to communication. Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories.

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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

ENL-151

COMMUNICATIVE ENGLISH-II

**Credits: 2-0-0**

**Total Marks-100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Objective:** To introduce students to the skills and strategies of reading and writing by identifying organizational patterns, spotting classification systems and understanding associations between ideas. This course will prepare students to read a variety of texts and also to communicate more effectively through writing. The course will also pay special attention to vocabulary building.

**Prescribed Text books:**

- *The Written Word* by Vandana R. Singh, Oxford University Press, New Delhi.
- *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

**SECTION-A**

Practical question on Note Making, Summarizing and Abstracting as given in *The Written Word* by Vandana R. Singh

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**SECTION-B**

Practical question on Paragraph writing as prescribed in *The Written Word* by Vandana R. Singh

**SECTION-C**

Theoretical questions based on ABC of Good Notes as prescribed in *The Written Word* by Vandana R. Singh.

Section C from *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

**SECTION-D**

Practical question on Essay writing from *The Written Word* by Vandana R. Singh

Section 4 from *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

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SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**PBL 131 : ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ-II**  
(Ability Enhancement Compulsory Course)

ਸਮਾਂ : 3 ਘੰਟੇ

ਕਰੈਡਿਟ : 2

ਕੁਲ ਅੰਕ : 50

Mid Semester Examination: 20% weightage

End Semester Examination: 80% weightage

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੈਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਸੈਕਸ਼ਨ-ਏ**

- I. ਸਰਵੋਤਮ ਪੰਜਾਬੀ ਸਾਹਿਤ (ਸੰਪਾ. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਡਾ. ਮੇਘਾ ਸਲਵਾਨ)  
1-4 ਨਿਬੰਧ  
(ਨਿਬੰਧ ਦਾ ਸਾਰ, ਵਾਰਤਕ ਕਲਾ ਅਤੇ ਸ਼ੈਲੀ)
- II. ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਧਾਤੂ/ਮੂਲ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਪਿਛੇਤਰ, ਵਿਉਂਤਪਤ ਅਤੇ ਰੁਪਾਂਤਰੀ), ਸਮਾਸ।

**ਸੈਕਸ਼ਨ-ਬੀ**

- I. ਸਰਵੋਤਮ ਪੰਜਾਬੀ ਸਾਹਿਤ (ਸੰਪਾ. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਡਾ. ਮੇਘਾ ਸਲਵਾਨ)  
5-8 ਨਿਬੰਧ  
(ਨਿਬੰਧ ਦਾ ਸਾਰ, ਵਾਰਤਕ ਕਲਾ ਅਤੇ ਸ਼ੈਲੀ)
- II. ਪੈਰ੍ਹਾ ਰਚਨਾ : ਕਲਾਸ ਵਿੱਚ 10 ਵਿਸ਼ਿਆਂ (ਸਭਿਆਚਾਰ, ਧਾਰਮਕ ਅਤੇ ਰਾਜਨੀਤਕ) 'ਤੇ ਪੈਰ੍ਹਾ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ।

**ਸੈਕਸ਼ਨ-ਸੀ**

- I. ਸਰਵੋਤਮ ਪੰਜਾਬੀ ਸਾਹਿਤ (ਸੰਪਾ. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਡਾ. ਮੇਘਾ ਸਲਵਾਨ)  
1-4 ਰੇਖਾ ਚਿੱਤਰ  
(ਨਾਇਕ ਬਿੰਬ, ਕਲਾਤਮਕ ਪੱਖ)
- II. ਮੁਹਾਵਰੇ ਤੇ ਅਖਾਣ (ਅਖਾਣ ਤੇ ਮੁਹਾਵਰਾ ਕੋਸ਼ ਵਿੱਚ) 200 ਮੁਹਾਵਰਿਆਂ ਅਤੇ 100 ਅਖਾਣਾਂ ਨੂੰ ਵਾਕਾਂ ਵਿੱਚ ਵਰਤਣ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ (ਕਲਾਸ ਵਿੱਚ ਤੇ ਘਰ ਲਈ)।



B.SC. (HONS.) AGRICULTURE SEMESTER-II  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

### ਸੈਕਸ਼ਨ-ਡੀ

- I. ਸਰਵੋਤਮ ਪੰਜਾਬੀ ਸਾਹਿਤ (ਸੰਪਾ. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਡਾ. ਮੇਘਾ ਸਲਵਾਨ)  
5-8 ਰੇਖਾ ਚਿਤਰ  
(ਨਾਇਕ ਬਿੰਬ, ਕਲਾਤਮਕ ਪੱਖ)
- II. ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਨਾਂਵ, ਪੜਨਾਂਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸੰਬੰਧਕ

#### ਸਹਾਇਕ ਪੁਸਤਕਾਂ

1. ਸਤਿੰਦਰ ਸਿੰਘ, ਪੰਜਾਬੀ ਵਾਰਤਕ ਦਾ ਇਤਿਹਾਸ, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ।
2. ਪ੍ਰੋ. ਪਿਆਰਾ ਸਿੰਘ, ਪੰਜਾਬੀ ਵਾਰਤਕ : ਸਿਧਾਂਤ ਇਤਿਹਾਸ ਪ੍ਰਵਿਰਤੀਆਂ, ਨਿਊ ਬੁੱਕ ਕੰਪਨੀ, ਜਲੰਧਰ।
3. ਇੰਦਰਪ੍ਰੀਤ ਸਿੰਘ ਧਾਮੀ, ਪੰਜਾਬੀ ਰੇਖਾ ਚਿਤਰ : ਰੂਪ ਤੇ ਪ੍ਰਕਾਰਜ, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
4. ਬਲਬੀਰ ਸਿੰਘ ਦਿਲ, ਪੰਜਾਬੀ ਨਿਬੰਧ : ਸਰੂਪ, ਸਿਧਾਂਤ ਅਤੇ ਵਿਕਾਸ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ।
5. ਹਰਕੀਰਤ ਸਿੰਘ ਤੇ ਗਿਆਨੀ ਲਾਲ ਸਿੰਘ, ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਣ, ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ, ਚੰਡੀਗੜ੍ਹ।
6. ਡਾ. ਅਮਰ ਕੌਮਲ (ਸੰਪਾ.), ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਨਿਬੰਧ (ਭੂਮਿਕਾ), ਨੈਸ਼ਨਲ ਬੁੱਕ ਟਰੱਸਟ, ਇੰਡੀਆ।
7. ਅਬਨਾਸ ਕੌਰ, ਪੰਜਾਬੀ ਰੇਖਾ ਚਿੱਤਰ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ।
8. ਮਿੰਨੀ ਸਲਵਾਨ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਮੁੱਢਲੇ ਸੰਕਲਪ, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
9. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਸਿਧਾਂਤ ਤੇ ਵਿਹਾਰ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ।

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**PBL-132 : ਮੁੱਢਲੀ ਪੰਜਾਬੀ**  
(In lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ

ਕਰੈਡਿਟ : 2

ਕੁਲ ਅੰਕ : 50

Mid Semester Examination: 20% weightage

End Semester Examination: 80% weightage

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਸੈਕਸ਼ਨ-ਏ**

ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ  
(ਨਾਂਵ, ਪੜਨਾਂਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ)

**ਸੈਕਸ਼ਨ-ਬੀ**

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ : ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਰਿਸ਼ਤੇ-ਨਾਤੇ, ਖੇਤੀ ਅਤੇ ਹੋਰ ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਤ

**ਸੈਕਸ਼ਨ-ਸੀ**

ਪੰਜਾਬੀ ਵਾਕ-ਬਣਤਰ  
ਸਾਧਾਰਨ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)  
ਸੰਯੁਕਤ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)  
ਮਿਸ਼ਰਤ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

**ਸੈਕਸ਼ਨ-ਡੀ**

ਪੈਰ੍ਹਾ ਰਚਨਾ  
ਸੰਖੇਪ ਰਚਨਾ

**ਸਹਾਇਕ ਪੁਸਤਕਾਂ**

1. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਸਿਧਾਂਤ ਅਤੇ ਵਿਹਾਰ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ।
2. ਮੁੱਢਲੀ ਪੰਜਾਬੀ, ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸੰਨਜ਼, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
3. ਮਿੰਨੀ ਸਲਵਾਨ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਮੁੱਢਲੇ ਸੰਕਲਪ, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
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**HSL-102: PUNJAB HISTORY AND CULTURE (1717-1947)**  
(Special paper in lieu of Punjabi Compulsory)

**Credits: 2-0-0**

**Marks: 50**

**Mid Semester Examination: 20% Weightage**

**End Semester Examination: 80% Weightage**

**Instructions for the Paper Setters**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**SECTION-A**

1. Sikh Struggle for Sovereignty.
2. Ranjit Singh: Conquests, Administration and the Anglo-Sikh Relations.

**SECTION-B**

3. Anglo-Sikh Wars and the Annexation.
4. The Punjab under the British: New Administration, Education and social Change.

**SECTION-C**

5. Economic Changes: Agricultural
6. Socio-Religious Reform Movements.

**SECTION-D**

7. Role of Punjab in the Freedom Struggle.
8. Fairs and Festivals.

**Suggested Reading**

1. Kirpal Singh (ed.), *History and Culture of the Punjab*, Part-II, Punjabi University, Patiala, 1990.
2. Fauja Singh (ed.), *History of Punjab*, Vol, III, Punjabi University, Patiala, 1987.
3. J.S. Grewal, *The Sikhs of the Punjab*, Cup, Cambridge, 1991.
4. Khushwant Singh, *A History of the Sikhs*, Vol. I, OUP, New Delhi, 1990

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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**SEMESTER-II**

**AGP-171: Lab in Fundamentals of Plant Biochemistry and Biotechnology**

**Credit 0-0-1**

Preparation of solution, pH & buffers, Qualitative tests of carbohydrates, amino acids and proteins. Paper chromatography, Sterilization techniques. Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium. Callus induction from various explants, micropropagation.

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**AGP-172:**

**Lab in Fundamentals of Horticulture**

**Credit 0-0-1**

Identification of garden tools. Identification of horticultural crops. Preparation of seed bed/nursery bed. Practice of sexual and asexual methods of propagation including micro-propagation. Layout and planting of orchard. Training and pruning of fruit trees. Preparation of potting mixture. Fertilizer application in different crops. Visits to commercial nurseries/orchard.

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**AGP-173**

**Lab in Soil and Water Conservation Engineering**

**Credit 0-0-1**

- 1) General Status of Soil Conservation in India
- 2) Calculation of erosion index
- 3) Estimation of soil loss
- 4) Design of contour bunds
- 5) Design of graded bunds
- 6) Design of bench terracing system
- 7) Problems on wind erosion

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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-174**

**Lab in Fundamentals of Crop Physiology**

**Credit 0-0-1**

Study of plant cells, structure and distribution of stomata, imbibitions, osmosis, plasmolysis, measurement of root pressure, rate of transpiration, Separation of photosynthetic pigments through paper chromatography, photosynthesis, respiration, tissue test for mineral nutrients, estimation of relative water content.

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**AGP-175:**

**Lab in Fundamentals of Plant Pathology**

**Credit 0-0-1**

Acquaintance with various laboratory equipments and microscopy. Collection and preservation of disease specimen. Preparation of media, isolation and Koch's postulates. General study of different structures of fungi. Study of symptoms of various plant diseases. Study of representative fungal genera. Transmission of plant viruses. Study of phanerogamic plant parasites. Study of fungicides and their formulations. Methods of pesticide application and their safe use. Calculation of fungicide sprays concentrations.



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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-176**

**Lab in Fundamentals of Entomology**

**Credit 0-0-1**

Methods of collection and preservation of insects including immature stages;

External features of Grasshopper

Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. Types of insect larvae and pupae;

Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper);

Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance.

Insecticides and their formulations. Pesticide appliances and their maintenance.

Sampling techniques for estimation of insect population and damage

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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-177**

**Lab in Fundamentals of Agricultural Extension Education**

**Credit 0-0-1**

To get acquainted with university extension system. Group discussion- exercise; handling and use of audio visual equipments and digital camera and LCD projector; preparation and use of AV aids, preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories; Presentation skills exercise; micro teaching exercise; Role of community radio and television studio for understanding the process of programme production; script writing, writing for print and electronic media, developing script for radio and television.

B.SC. (HONS.) AGRICULTURE SEMESTER-III  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-201:**  
**Time: 3 Hours**

**Crop Production Technology-I (Kharif Crops)**

**Credit 1-0-0**  
**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *Kharif* crops, as per section.

**Section-A**

Cereals – rice, maize, sorghum, pearl millet and finger millet.

**Section-B**

Pulses-pigeonpea, mungbean and urdbean.

**Section-C**

Oilseeds- groundnut, and soybean; fibre crops- cotton & Jute.

**Section-D**

Forage crops-sorghum, cowpea, cluster bean and napier.

**B.SC. (HONS.) AGRICULTURE SEMESTER-III**  
**(CREDIT BASED EVALUATION AND GRADING SYSTEM)**  
**SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**AGL-202****Agricultural Marketing, Trade and Prices****Time: 3 Hours****Credit 2-0-0****Marks: 100****Mid Semester Marks: 20****End Semester Marks: 80****Mid Semester Examination: 20% weightage****End Semester Examination: 80% weightage****Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, classification and characteristics of agricultural markets ; demand, supply and producer's surplus of agri commodities: nature and determinants of demand and supply of farm products, producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities.

**Section-B**

Marketing process-concentration, dispersion and equalization; exchange functions – buying and selling; physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labeling (Agmark); Market functionaries and marketing channels.

**Section-C**

Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel; number of channel levels; marketing channels for different farm products; Integration, efficiency, costs and price spread: Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs.

**Section-D**

Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions cooperative marketing in India; Risk in marketing: Types of risk in marketing; speculation & hedging; an overview of futures trading; Agricultural prices and policy: Meaning and functions of price; administered prices; need for agricultural price policy; Trade: Concept of International Trade and its need, theories of absolute and comparative advantage. GATT and WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR.

B.SC. (HONS.) AGRICULTURE SEMESTER-III  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-203:**  
**Time: 3 Hours**

**Agricultural Finance and Co-Operation**

**Credit 2-0-0**  
**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Agricultural Finance- meaning, scope and significance, credit needs and its role in Indian agriculture. Agricultural credit: meaning, definition, need, classification. Credit analysis: 4 R's, and 3C's of credits.

**Section-B**

Sources of agricultural finance: institutional and non-institutional sources, commercial banks, social control and nationalization of commercial banks, Micro financing including KCC. Lead bank scheme, RRBs, Scale of finance and unit cost.

**Section-C**

An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, world bank. Preparation and analysis of financial statements – Balance Sheet and Income Statement. Basic guidelines for preparation of project reports.

**Section-D**

Agricultural Cooperation – Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture.

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**AGL-204**  
**Time: 3 Hours**

**Agricultural Informatics**

**Credit 1-0-0**  
**Marks: 100**  
**Mid Semester Marks: 20**  
**End Semester Marks: 80**  
**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Introduction to Computers, Operating Systems, definition and types, Applications of MS- Office for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions.

**Section-B**

Database, concepts and types, uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations.

**Section-C**

e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models for understanding plant processes..

**Section-D**

Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions. Preparation of contingent crop-planning using IT tools.

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**AGL-205**

**Farm Machinery and Power**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Farm power in India & Sources. IC engine & terminology, Working Principle of 2-stroke & 4-Stroke engine & numerical problem.

**Section-B**

Different system of tractor, Primary & Secondary implements, Implementation for intercultural operations, Mulcher

**Section-C**

Familiarization with sowing & planting equipments, Happy Seeder, Seed Drill, Calibration of Seed drill, & paddy transplanter, its mechanism, Direct seedling Rice(DSR) & some numerical problems.

**Section-D**

Plant protection equipment, Familiarization with Harvesting & Threshing equipment, Cost of operation of tractor & Machinery.

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**SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**AGL-206:                      Production Technology for Vegetable and Spices**  
**Time: 3 Hours** **Credit 1-0-0**  
**Marks: 100**  
**Mid Semester Marks: 20**  
**End Semester Marks: 80**  
**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Importance of vegetables & spices in human nutrition and national economy, brief about origin, area, production, improved varieties and cultivation practices such as time of sowing, sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting, storage, physiological disorders, disease and pest control and seed production of important vegetable groups:

**Section-A**

Solanaceous, Cucurbitaceaeous.

**Section-B**

Cole, Root crops.

**Section-C**

Bulb, Tuber.

**Section-D**

Leafy and salad crops) and Spices.



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**AGL-207**

**Livestock and Poultry Management**

**Time: 3 Hours**

**Credit 3-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Role of livestock in the national economy. Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry.

**Section B**

Management of calves, growing heifers and milch animals. Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers.

**Section C**

Digestion in livestock and poultry. Classification of feedstuffs. Proximate principles of feed. Nutrients and their functions. Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry.

**Section D**

Reproduction in farm animals and poultry. Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.

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**AGL-208:**  
**Time: 3 Hours**

**Statistical Methods**

**Credit 2-0-0**  
**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Introduction to Statistics and its Applications in Agriculture, Graphical Representation of Data, Measures of Central Tendency.

**Section-B**

Dispersion, Definition of Correlation, Scatter Diagram. Karl Pearson's Coefficient of Correlation. Linear Regression Equations.

**Section-C**

Introduction to Test of Significance, One sample & two sample test t for Means, Chi-Square Test of Independence of Attributes in  $2 \times 2$  Contingency Table.

**Section-D:**

Introduction to Analysis of Variance, Analysis of One Way Classification. Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement,

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**AGL-209**

**Disaster Management**

**Time: 3 Hours**

**Credit 3-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Natural Disasters- Meaning and nature of natural disasters, their types and effects. cyclone, avalanches, volcanic eruptions, Heat and cold waves, Man Made Disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire.

**Section-B**

Disaster Management- Effect to mitigate natural disaster at national and global levels. International strategy for disaster reduction.

**Section-C**

Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community –based organizations and media.

**Section-D**

Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

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**AGP-221:                      Lab in Crop Production Technology-I (Kharif Crops)                      Credit 0-0-1**

Rice nursery preparation, transplanting of rice, sowing of soybean, pigeonpea and mungbean. maize, groundnut and cotton, effect of seed size on germination and seedling vigour of kharif season crops, effect of sowing depth on germination of kharif crops, identification of weeds in kharif season crops, top dressing and foliar feeding of nutrients, study of yield contributing characters and yield calculation of kharif season crops, study of crop varieties and important agronomic experiments at experimental farm. study of forage experiments, morphological description of kharif season crops, visit to research centres of related crops.

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**AGP-222**

**Lab in Agricultural Marketing, Trade and Prices**

**Credit 0-0-1**

Study of relationship between market arrivals and prices of some selected commodities; Computation of marketable and marketed surplus of important commodities; Study of price behaviour over time for some selected commodities; To study various marketing functions performed by different agencies, identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class.

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**AGP-223:**

**Lab in Agricultural Finance and Co-Operation**

**Credit 0-0-1**

Analysis of progress and performance of cooperatives using published data. Analysis of progress and performance of commercial banks and RRBs using published data. Estimation of credit requirement of farm business – A case study. Preparation and analysis of balance sheet – A case study. Preparation and analysis of income statement – A case study. Appraisal of a loan proposal – A case study.

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**AGL-224**

**Lab in Agricultural Informatics**

**Credit 0-0-1**

Study of Computer Components, accessories, practice of important DOS Commands. Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document. MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data. MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system. Introduction to World Wide Web (WWW). Introduction of programming languages. Hands on Crop Simulation Models (CSM) such as DSSAT/Crop-Info/CropSyst/ Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools. Hands on Decision Support System. Preparation of contingent crop planning.

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**AGP-225**

**Lab in Farm Machinery and Power**

**Credit 0-0-1**

1. Study of different Components of IC engine.
2. Various systems of Tractor:-
  - ❖ Clutch
  - ❖ Transmission
  - ❖ Differential
  - ❖ Brake
  - ❖ Steering
3. Study of Mould Board plough, different parts, measurement, Plough size, and Horizontal & Vertical Suction.
4. Study of Reversible Mould Board Plough, disc plough & disc harrow.
5. Familiarization with seed cum fertilizer drill, Furrow openers, Seed metering mechanism & calibration.
6. Familiarization with different types of sprayers & dusters.
7. Familiarization with Harvesting and Threshing machinery.
8. Familiarization with planter, transplanter.
9. Familiarization with different Intercultural equipment.



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**AGP-226:                    Lab in Production Technology for Vegetable and Spices                    Credit 0-0-1**

Identification of vegetables & spices crops and their seeds. Nursery raising. Direct seed sowing and transplanting. Study of morphological characters of different vegetables & spices. Fertilizers applications. Raising of nursery of vegetables & spices. Vegetables & spices seed extraction. Harvesting & preparation for market. Economics of vegetables and spices cultivation

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**AGP-227**

**Lab in Livestock and Poultry Management**

**Credit 0-0-1**

1. External body parts of cattle, buffalo, sheep, goat, swine and poultry.
2. Handling and restraining of livestock.
3. Identification methods of farm animals and poultry.
4. Judging of cattle, buffalo and poultry.
5. Culling of livestock and poultry.
6. Planning and layout of housing for different types of livestock.
7. Computation of rations for livestock. Formulation of concentrate mixtures.
8. Hatchery operations, incubation and hatching equipments.
9. Management of chicks, growers and layers.
10. Debeaking, dusting and vaccination.
11. Economics of cattle, buffalo, sheep, goat, swine and poultry production.

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**AGP-228**

**Lab in Statistical methods**

**Credit 0-0-1**

Graphical Representation of Data. Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Dispersion (Ungrouped Data). Measures of Dispersion (Grouped Data). Moments, Correlation & Regression Analysis. Application of One Sample t-test. Application of Two Sample Fisher's t-test. Chi-Square test of Goodness of Fit. Chi-Square test of Independence of Attributes for  $2 \times 2$  contingency table. Analysis of Variance One Way Classification. Analysis of one way.

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**AGL-251**

**Crop Production Technology-II (Rabi crops)**

**Time: 3 Hours**

**Credit 1-0-0  
Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi crops as per section:

**Section-A**

Cereals –wheat and barley, pulses-chickpea, lentil, peas.

**Section-B**

Oilseeds-rape seed, mustard and sunflower

**Section-C**

Sugar crops-sugarcane; medicinal and aromatic crops-mentha, lemon grass and citronella

**Section-D**

Forage crops-berseem, lucerne and oat.

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**AGL-252      Production Technology for Ornamental Crops, MAPs and Landscaping**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers.

**Section-B**

Production technology of important cut flowers like rose, gerbera, carnation, liliium and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions.

**Section-C**

Package of practices for loose flowers like marigold and jasmine under open conditions. Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol

**Section-D**

Aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rosegeranium, vetiver. Processing and value addition in ornamental crops and MAPs produce.

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**AGL-253**

**Renewable Energy & Green Technology**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Classification of energy sources and their contribution in Agricultural sector. Briquettes and uses of briquettes.

**Section-B**

Biomass utilization for bio-fuel production and their application , Biogas, Bio-alcohol, Biodiesel and bio-oil production and their utilization as bio-energy resources.

**Section-C**

Introduction to solar energy, Collection and their applications, Solar energy Gadgets, Solar cooker, solar water heater.

**Section-D**

Application of Solar Energy; Solar drying , Solar pond, Solar pump, Solar distillation, Solar photovoltaic system and their application. Introduction to wind energy, types and their application.

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**AGL-254**

**Problematic Soils and their Management**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Soil quality and health, Distribution of Waste land and problem soils in India, their Categorization based on properties. Problematic soils under different Agro-ecosystems.

**Section-B**

Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils. Multipurpose tree species, bio remediation through MPTs of soils.

**Section-C**

Remote sensing and GIS in diagnosis and management of problem soils. land capability and classification, land suitability classification.

**Section-D**

Irrigation water – quality and standards, utilization of saline water in agriculture.

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**AGL-255:                    Production Technology for Fruit and Plantation Crops**  
**Time: 3 Hours** **Credit 1-0-0**  
**Marks: 100**  
**Mid Semester Marks: 20**  
**End Semester Marks: 80**  
**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Importance and scope of fruit and plantation crop industry in India; High density planting; Use of rootstocks.

**Section-B**

Production technologies for the cultivation of major fruits-mango, citrus, grape, plum, almond, guava, litchi, papaya, pear, peach

**Section-C**

Minor fruits- pineapple, pomegranate, jackfruit, strawberry.

**Section-D**

Cashew, tea, coffee.



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**AGL-256**

**Principles of Seed Technology**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section- A**

Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production. Seed quality- Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables.

**Section-B**

Seed certification, phases of certification, procedure for seed certification, field inspection. Seed Act and Seed Act enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983, Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test. Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops and organic seed production.

**Section-C**

Seed drying, processing and their steps, seed testing for quality assessment, seed treatment, its importance, method of application and seed packing. Seed storage; general principles, stages and factors affecting seed longevity during storage. Measures for pest and disease control during storage.

**Section-D**

Seed marketing: structure and organization, sales, generation activities, promotional media. Factors affecting seed marketing, Role of WTO and OECD in seed marketing. Private and public sectors and their production and marketing strategies.

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**AGL- 257**  
**Time: 3 Hours**

**Farming System and Sustainable Agriculture**

**Credit 1-0-0**  
**Marks: 100**  
**Mid Semester Marks: 20**  
**End Semester Marks: 80**  
**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation.

**Section-B**

Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system; Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability.

**Section-C**

Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones.

**Section-D**

Resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field.

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**AGL- 258:**  
**Time: 3 Hours**

**Fundamentals of Plant Breeding**

**Credit 2-0-0**  
**Marks: 100**  
**Mid Semester Marks: 20**  
**End Semester Marks: 80**  
**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Historical development, concept, nature and role of plant breeding, major achievements and future prospects; modes of reproduction and apomixis, self – incompatibility and male sterility- genetic consequences, cultivar options. Domestication, Acclimatization, introduction; Centres of origin/diversity.

**Section-B**

Genetics in relation to plant breeding, components of Genetic variation; Heritability and genetic advance; Genetic basis and breeding methods in self- pollinated crops-mass and pure line selection, hybridization techniques and handling of segregating population; Multiline concept. Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops, modes of selection.

**Section-C**

Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops, clonal selection and hybridization; Wide hybridization and pre-breeding.

**Section-D**

Polyploidy in relation to plant breeding, mutation breeding-methods and uses; Biotechnological tools-DNA markers and marker assisted selection. Participatory plant breeding; Intellectual Property Rights, Patenting, Plant Breeders and Farmer's Rights.

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**AGL-259:                    Introductory Agro-meteorology & Climate Change**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Meaning and scope of agricultural meteorology.

**Section-A**

Earth atmosphere- its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze; Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, longwave and thermal radiation, net radiation, albedo.

**Section-B**

Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, Energy balance of earth; Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail.

**Section-C**

Cloud formation and classification; Artificial rainmaking. Monsoon- mechanism and importance in Indian agriculture, Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave.

**Section-D**

Agriculture and weather relations; Modifications of crop microclimate, climatic normals for crop and livestock production. Weather forecasting- types of weather forecast and their uses. Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-260**

**Human Values & Ethics**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Values and Ethics-An Introduction. Goal and Mission of Life.

**Section-B**

Vision of Life. Principles and Philosophy. Self Exploration. Self Awareness. Self Satisfaction.

**Section-C**

Decision Making. Motivation. Sensitivity. Success. Selfless Service. Positive Spirit.

**Section-D**

Case Study of Ethical Lives. Body, Mind and Soul. Attachment and Detachment. Spirituality Quotient. Examination

**B.SC. (HONS.) AGRICULTURE SEMESTER-IV**  
**(CREDIT BASED EVALUATION AND GRADING SYSTEM)**  
**SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**AGL-261****Agrochemicals****Time: 3 Hours****Credit 2-0-0****Marks: 100****Mid Semester Marks: 20****End Semester Marks: 80****Mid Semester Examination: 20% weightage****End Semester Examination: 80% weightage****Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section–A**

An introduction to agrochemicals, their type and role in agriculture, effect on environment, soil, human and animal health, merits and demerits of their uses in agriculture, management of agrochemicals for sustainable agriculture. Herbicides-Major classes, properties and important herbicides. Fate of herbicides. Fungicides - Classification – Inorganic fungicides - characteristics, preparation and use of sulfur and copper, Mode of action-Bordeaux mixture and copper oxychloride. Organic fungicides- Mode of action- Dithiocarbamates-characteristics, preparation and use of Zineb and maneb. Systemic fungicides- Benomyl, carboxin, oxycarboxin, Metalaxyl, Carbendazim, characteristics and use.

**Section-B**

Introduction and classification of insecticides: inorganic and organic insecticides Organochlorine, Organophosphates, Carbamates, Synthetic pyrethroids Neonicotinoids, Biorationals, Insecticide Act and rules, Insecticides banned, withdrawn and restricted use, Fate of insecticides in soil & plant. IGRs Biopesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses.

**Section–C**

Fertilizers and their importance. Nitrogenous fertilizers: Feed stocks and Manufacturing of ammonium sulphate, ammonium nitrate, ammonium chloride, urea. Slow release N-fertilizers. Phosphatic fertilizers: feedstock and manufacturing of single superphosphate. Preparation of bone meal and basic slag. Potassic fertilizers: Natural sources of potash, manufacturing of potassium chloride, potassium sulphate and potassium nitrate.

**Section–D**

Mixed and complex fertilizers: Sources and compatibility–preparation of major, secondary and micronutrient mixtures. Complex fertilizers: Manufacturing of ammonium phosphates, nitrophosphates and NPK complexes. Fertilizer control order. Fertilizer logistics and marketing. Plant bio-pesticides for ecological agriculture, Bio-insect repellent.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-262**

**Weed Management**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Introduction to weeds, characteristics of weeds their harmful and beneficial effects on ecosystem. Classification, reproduction and dissemination of weeds.

**Section-B**

Herbicide classification, concept of adjuvant, surfactant, herbicide formulation and their use. Introduction to mode of action of herbicides and selectivity.

**Section-C**

Allelopathy and its application for weed management. Bio-herbicides and their application in agriculture. Concept of herbicide mixture and utility in agriculture. Herbicide compatibility with agro-chemicals and their application.

**Section-D**

Integration of herbicides with non chemical methods of weed management. Herbicide Resistance and its management.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-263**

**Biopesticides & Biofertilizers**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section- A**

History and concept of biopesticides. Importance, scope and potential of biopesticide. Definitions, concepts and classification of biopesticides viz. pathogen, botanical pesticides, and biorationales. Botanicals and their uses.

**Section-B**

Mass production technology of bio-pesticides. Virulence, pathogenicity and symptoms of entomopathogenic pathogens and nematodes. Methods of application of biopesticides. Methods of quality control and Techniques of biopesticides. Impediments and limitation in production and use of biopesticide.

**Section–C**

Biofertilizers – Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- *Azospirillum*, *Azotobacter*, *Bacillus*, *Pseudomonas*, *Rhizobium* and *Frankia*; Cynobacterial biofertilizers- *Anabaena*, *Nostoc*, *Hapalosiphon* and fungal biofertilizers- VAM mycorrhiza and ectomycorrhiza. Nitrogen fixation –Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K solubilization.

**Section- D**

Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertiizers. FCO specifications and quality control of biofertilizers. Application technology for seeds, seedlings, tubers, sets etc. Biofertilizers –Storage, shelf life, quality control and marketing. Factors influencing the efficacy of biofertilizers.



B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-264**  
**Time: 3 Hours**

**System Simulation and Agroadvisory**

**Credit 1-0-0**  
**Marks: 100**  
**Mid Semester Marks: 20**  
**End Semester Marks: 80**  
**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

System Approach for representing soil-plant-atmospheric continuum, system boundaries, Crop models, concepts & techniques, types of crop models, data requirements, relational diagrams.

**Section-B**

Evaluation of crop responses to weather elements; Elementary crop growth models; calibration, validation, verification and sensitivity analysis. Potential and achievable crop production- concept and modelling techniques for their estimation.

**Section-C**

Crop production in moisture and nutrients limited conditions; components of soil water and nutrients balance. Weather forecasting, types, methods, tools & techniques, forecast verification; Value added weather forecast, ITK for weather forecast and its validity.

**Section-D**

Crop-Weather Calendars; Preparation of agro-advisory bulletin based on weather forecast. Use of crop simulation model for preparation of Agro-advisory and its effective dissemination.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-271**

**Lab in Crop Production Technology-II (Rabi crops)**

**Credit 0-0-1**

Sowing methods of wheat and sugarcane, identification of weeds in rabi season crops, study of morphological characteristics of rabi crops, study of yield contributing characters of rabi season crops, yield and juice quality analysis of sugarcane, study of important agronomic experiments of rabi crops at experimental farms. Study of rabi forage experiments, oil extraction of medicinal crops, visit to research stations of related crops.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-272 Lab in Production Technology for Ornamental Crops, MAPs and Landscaping**

**Credit 0-0-1**

Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. Training and pruning of Ornamental plants. Planning and layout of garden. Bed preparation and planting of MAP. Protected structures – care and maintenance. Intercultural operations in flowers and MAP. Harvesting and post harvest handling of cut and loose flowers. Processing of MAP. Visit to commercial flower/MAP unit.

**B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**AGP-273**

**Lab in Renewable Energy & Green Technology**

**Credit 0-0-1**

- To study biogas plants.
- To study Gasifiers.
- To study the production process of bio diesel.
- To study briquetting machine.
- To study the production process of bio-fuels.
- To study solar cooker.
- To study solar drying system.
- To study solar distillation.
- To study the performance of wind mill.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-274**

**Lab in Problematic Soils and their Management**

**Credit 0-0-1**

- Characterization of acid, acid sulfate, salt-affected and calcareous soils.
- Determination of cations ( $\text{Na}^+$  ,  $\text{K}^+$  ,  $\text{Ca}^{++}$  and  $\text{Mg}^{++}$ ) in irrigation water and soil samples.
- Determination of anions ( $\text{Cl}^-$  ,  $\text{SO}_4^{--}$ ,  $\text{CO}_3^{--}$  and  $\text{HCO}_3^-$  ) in irrigation waters and soil samples.
- Determination of  $\text{CaCO}_3$  in calcareous soils.
- Lime requirements of acid soil and gypsum requirements of sodic soil.
- Computation of SAR and RSC of irrigation water.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-275:            Lab in Production Technology for Fruit and Plantation Crops**  
**Credit 0-0-1**

Seed propagation. Scarification and stratification of seeds. Propagation methods for fruit and plantation crops including Micro-propagation. Description and identification of fruit. Preparation of plant bio regulators and their uses, Identification of Pests, diseases and physiological disorders of above fruit and plantation crops, Visit to commercial orchard.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-276**

**Lab in Principles of Seed Technology**

**Credit 0-0-1**

- Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi.
- Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea.
- Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard.
- Seed production in important vegetable crops: Solanaceous, Cruciferous, Malvaceous, Amaryllidaceous and Cucurbitaceous
- Seed sampling and testing: Physical purity, germination, viability, etc. Seed and seedling vigour test.
- Genetic purity test: Grow out test.
- Seed certification: Procedure, Field inspection and preparation of field inspection report.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP- 277:**

**Lab in Fundamentals of Plant Breeding**

**Credit 0-0-1**

Plant Breeder's kit, Study of germplasm of various crops. Study of floral structure of self-pollinated and cross pollinated crops. Emasculation and hybridization techniques in self & cross pollinated crops. Consequences of inbreeding on genetic structure of resulting populations. Study of male sterility system. Handling of segregation populations. Methods of calculating mean, range, variance, standard deviation, heritability. Designs used in plant breeding experiment, analysis of Randomized Block Design. To work out the mode of pollination in a given crop and extent of natural out crossing. Prediction of performance of double cross hybrids



B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-278: Lab in Introductory Agro-meteorology & Climate Change**

**Credit 0-0-1**

Visit of Agrometeorological Observatory, site selection of observatory, exposure of instruments and weather data recording. Measurement of total, shortwave and longwave radiation, and its estimation using Planck's intensity law. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS. Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis. Measurement of soil temperature and computation of soil heat flux. Determination of vapor pressure and relative humidity. Determination of dew point temperature. Measurement of atmospheric pressure and analysis of atmospheric conditions. Measurement of wind speed and wind direction, preparation of windrose. Measurement, tabulation and analysis of rain. Measurement of open pan evaporation and evapotranspiration. Computation of PET and AET.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-279****Lab in Agrochemicals****Credit 0-0-1**

Sampling of fertilizers and pesticides. Pesticides application technology to study about various pesticides appliances. Quick tests for identification of common fertilizers. Identification of anion and cation in fertilizer. Calculation of doses of insecticides to be used. To study and identify various formulations of insecticide available in market. Estimation of nitrogen in Urea. Estimation of water soluble P<sub>2</sub>O<sub>5</sub> and citrate soluble P<sub>2</sub>O<sub>5</sub> in single super phosphate. Estimation of potassium in Muriate of Potash/ Sulphate of Potash by flame photometer. Determination of copper content in copper oxychloride. Determination of sulphur content in sulphur fungicide. Determination of thiram. Determination of ziram content.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-280**

**Lab in Weed Management**

**Credit 0-0-1**

Techniques of weed preservation. Weed identification and their losses study. Biology of important weeds. Study of herbicide formulations and mixture of herbicide. Herbicide and agrochemicals study. Shift of weed flora study in long term experiments. Study of methods of herbicide application, spraying equipments. Calculations of herbicide doses and weed control efficiency and weed index.

B.SC. (HONS.) AGRICULTURE SEMESTER-IV  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-281**

**Lab in Biopesticides & Biofertilizers**

**Credit 0-0-1**

Isolation and purification of important biopesticides: *Trichoderma Pseudomonas, Bacillus, Metarhizium* etc. and its production. Identification of important botanicals. Visit to biopesticide laboratory in nearby area. Field visit to explore naturally infected cadavers. Identification of entomopathogenic entities in field condition. Quality control of biopesticides. Isolation and purification of *Azospirillum*, *Azotobacter*, *Rhizobium*, P-solubilizers and cyanobacteria. Mass multiplication and inoculums production of biofertilizers. Isolation of VAM fungi –Wet sieving method and sucrose gradient method. Mass production of VAM inoculants.

**AGP-282**

**Lab in System Simulation and Agroadvisory**

**Credit 0-0-1**

Preparation of crop weather calendars. Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts. Working with statistical and simulation models for crop growth. Potential & achievable production; yield forecasting, insect & disease forecasting models. Simulation with limitations of water and nutrient management options. Sensitivity analysis of varying weather and crop management practices. Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast. Feedback from farmers about the agroadvisory.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-301 Principles of Integrated Pest and Disease Management**  
**Time: 3 Hours**

**Credit 2-0-0**  
**Marks: 100**  
**Mid Semester Marks: 20**  
**End Semester Marks: 80**  
**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Categories of insect pests and diseases, IPM: Introduction, history, importance, concepts, principles and tools of IPM. Economic importance of insect pests, diseases and pest risk analysis.

**Section-B**

Methods of detection and diagnosis of insect pest and diseases. Calculation and dynamics of economic injury level and importance of Economic threshold level.

**Section-c**

Methods of control: Host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control. Ecological management of crop environment. Introduction to conventional pesticides for the insect pests and disease management.

**Section-D**

Survey surveillance and forecasting of Insect pest and diseases. Development and validation of IPM module. Implementation and impact of IPM (IPM module for Insect pest and disease. Safety issues in pesticide uses. Political, social and legal implication of IPM.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-302**                      **Manures, Fertilizers and Soil Fertility Management**  
**Time: 3 Hours**

**Credit 2-0-0**  
**Marks: 100**  
**Mid Semester Marks: 20**  
**End Semester Marks: 80**  
**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Scientific name, order, family, distribution, identification, host range and nature of damage, biology and bionomics, and management of important arthropod pests

**Section-A**

Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring. Fertilizer recommendation approaches. Integrated nutrient management.

**Section-B**

Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary & micronutrient fertilizers, Complex fertilizers, nano fertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order.

**Section-C**

History of soil fertility and plant nutrition. criteria of essentiality. Role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients.

**Section-D**

Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-303      Pests of Crops and Stored Grains and their Management**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Polyphagous insect pests: Locust, grasshopper, white grub, termite and red hairy caterpillar. Pests of field crops Rice: Brown plant hopper, yellow stem borer, rice hispa. Sorghum: Shootfly; Maize: Stem borer; Sugarcane: Pyrilla, whitefly, shoot borer. Pulses: Gram pod borer, cutworm. Tobacco: Tobacco caterpillar. Oilseeds: Mustard aphid, sawfly, painted bug, groundnut aphid, soybean girdle beetle, castor semilooper, castor capsule borer, sesame leaf and capsule borer. Cotton: Jassid, whitefly, spotted and pink bollworm, red cotton bug.

**Section-B**

Pests of vegetables Brinjal- brinjal shoot and fruit borer; Tomato- Fruit borer (Covered in gram); Okra- Shoot and fruit borer (Covered in cotton). Potato: Tuber moth. Chilli: Thrips; Onion and garlic: Thrips. Cruciferous vegetables: Cabbage caterpillar, diamondback moth, semilooper, tobacco caterpillar (Covered in tobacco). Pea: Stem fly. Cucurbitaceous vegetables: Melon fruit fly, red pumpkin beetle, red vegetable mite.

**Section-C**

Pests of fruit crops Mango: Mango hopper, mealy bug, stem borer, fruit fly; Guava: Fruit fly. Citrus: Citrus psylla, citrus caterpillar, bark eating caterpillar. Pomegranate: Anar butterfly; Ber: Fruit fly. Coconut: Black headed caterpillar; Apple: San Jose scale, woolly aphid. Pests of ornamental crops: Rose aphid, hollyhock tinged bug, jasmine budworm. Pests of spices and condiments: Aphid, seed midge.

**Section-D**

Pests of stored grains: Khapra beetle, lesser grain borer, rice weevil, red rust flour beetle, pulse beetle, Angoumois grain moth, grain mite, Storage structures and methods of grain storage. Principles of stored grain pest management. Rodents and their management in fields and godowns. Birds of agricultural importance and their management.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-304 Diseases of Field & Horticultural Crops & their Management-I**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Symptoms, etiology, disease cycle and management of major diseases of following crops:

**Section-A**

**Field Crops: Rice:** blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro; **Maize:** stalk rots, downy mildew, leaf spots; **Sorghum:** smuts, grain mold and anthracnose, **Bajra** :downy mildew and ergot; **Groundnut:** early and late leaf spots, wilt **Soybean:** Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic.

**Section-B**

**Pigeonpea:** Phytophthora blight, wilt and sterility mosaic; **Finger millet:** Blast and leaf spot; **black & green gram:** Cercospora leaf spot and anthracnose, web blight and yellow mosaic; **Castor:** Phytophthora blight; **Tobacco:** black shank, black root rot and mosaic.

**Section-C**

**Horticultural Crops: Guava:** wilt and anthracnose; **Banana:** Panama wilt, bacterial wilt, Sigatoka and bunchy top; **Papaya:** foot rot, leaf curl and mosaic, **Pomegranate:** bacterial blight; **Cruciferous vegetables:** Alternaria leaf spot and black rot; **Brinjal:** Phomopsis blight and fruit rot and Sclerotinia blight.

**Section-D**

**Tomato:** damping off, wilt, early and late blight, buck eye rot and leaf curl and mosaic; **Okra:** Yellow Vein Mosaic; **Beans:** anthracnose and bacterial blight; **Ginger:** soft rot; **Colocasia:** Phytophthora blight; **Coconut:** wilt and bud rot; **Tea:** blister blight; **Coffee:** rust.



B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-305**

**Crop Improvement – I (*Kharif*)**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fibres; fodders and cash crops; vegetable and horticultural crops.

**Section-B**

Plant genetic resources, its utilization and conservation, study of genetics of qualitative and quantitative characters; Important concepts of breeding self pollinated, cross pollinated and vegetatively propagated crops.

**Section-C**

Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional).

**Section-D**

Hybrid seed production technology in Maize, Rice, Sorghum, Pearl millet and Pigeonpea, etc. Ideotype concept and climate resilient crop varieties for future.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-306      Entrepreneurship Development and Business Communication**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs; SWOT Analysis & achievement motivation, Government policy and programs and institutions for entrepreneurship development.

**Section-B**

Impact of economic reforms on Agribusiness/ Agri- enterprises, Entrepreneurial Development Process; Business Leadership Skills.

**Section-C**

Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation), Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skill.

**Section-D**

Supply chain management and Total quality management, Project Planning Formulation and report preparation; Financing of enterprise, Opportunities for agri-entrepreneurship and rural enterprise.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-307            Geoinformatics, Nano-Technology and Precision Farming**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture; Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture.

**Section-B**

Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; Spatial data and their management in GIS.

**Section-C**

Remote sensing concepts and application in agriculture; Image processing and interpretation; Global positioning system (GPS), components and its functions; Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs.

**Section-D**

STCR approach for precision agriculture; Nanotechnology, definition, concepts and techniques, brief introduction about nanoscale effects, nano-particles, nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in seed, water, fertilizer, plant protection for scaling-up farm productivity.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-308**

**Intellectual Property Rights**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs and WIPO, Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc.

**Section-B**

Types of Intellectual Property and legislations covering IPR in India:-Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database.

**Section-C**

Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India, Plant breeders rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights.

**Section-D**

Traditional knowledge-meaning and rights of TK holders. Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-309**

**Protected Cultivation**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Protected cultivation- importance and scope, Status of protected cultivation in India and World types of protected structure based on site and climate. Cladding material involved in greenhouse/poly house.

**Section-B**

Greenhouse design, environment control, artificial lights, Automation. Soil preparation and management, Substrate management. Types of benches and containers. Irrigation and fertigation management.

**Section-C**

Propagation and production of quality planting material of horticultural crops. Greenhouse cultivation of important horticultural crops – rose, carnation, chrysanthemum, gerbera, orchid, anthurium, liliium, tulip, tomato, bell pepper, cucumber, strawberry, pot plants, etc.

**Section-D**

Cultivation of economically important medicinal and aromatic plants. Off-season production of flowers and vegetables. Insect pest and disease management.

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SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-310**

**Micro Propagation Technique**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Introduction, History, Advantages and limitations.

**Section-B**

Types of cultures (seed, embryo, organ, callus, cell), Stages of micropropagation, Axillary bud proliferation (Shoot tip and meristem culture, bud culture).

**Section-C**

Organogenesis (callus and direct organ formation), Somatic embryogenesis, cell suspension cultures.

**Section-D**

Production of secondary metabolites, Somaclonal variation, Cryopreservation

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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-311**

**Landscaping**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes.

**Section-B**

Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting.

**Section-C**

Annuals: selection, propagation, planting scheme, Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas, Peri-urban landscaping.

**Section-D**

Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-312**  
**Time: 3 Hours**

**Hi-tech. Horticulture**

**Credit 2-0-0**  
**Marks: 100**  
**Mid Semester Marks: 20**  
**End Semester Marks: 80**  
**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Introduction & importance; Nursery management and mechanization; micro propagation of horticultural crops; Modern field preparation and planting methods.

**Section-B**

Protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation systems and its components; EC, pH based fertilizer scheduling, canopy management, high density orcharding.

**Section-C**

Components of precision farming: Remote sensing, Geographical Information System (GIS), Differential Geo positioning System (DGPS), Variable Rate applicator (VRA).

**Section-D**

Application of precision farming in horticultural crops (fruits, vegetables and ornamental crops); mechanized harvesting of produce.



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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-321**

**Practical Crop Production-I (*Kharif Crops*)**

**Credit 0-0-2**

Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-322            Lab in Principles of Integrated Pest and Disease Management**

**Credit 0-0-1**

Methods of diagnosis and detection of various insect pests, and plant diseases, Methods of insect pests and plant disease measurement, Assessment of crop yield losses, calculations based on economics of IPM, Identification of biocontrol agents, different predators and natural enemies. Mass multiplication of *Trichoderma*, *Pseudomonas*, *Trichogramma*, NPV etc. Identification and nature of damage of important insect pests and diseases and their management. Crop (agroecosystem) dynamics of a selected insect pest and diseases. Plan & assess preventive strategies (IPM module) and decision making. crop monitoring attacked by insect, pest and diseases . Awareness campaign at farmers fields.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-323            Lab in Manures, Fertilizers and Soil Fertility Management**

**Credit 0-0-1**

Introduction of analytical instruments and their principles, calibration and applications, Colorimetry and flame photometry. Estimation of soil organic carbon, Estimation of alkaline hydrolysable N in soils. Estimation of soil extractable P in soils. Estimation of exchangeable K; Ca and Mg in soils . Estimation of soil extractable S in soils.. Estimation of DTPA extractable Zn in soils. Estimation of N in plants. Estimation of P in plants. Estimation of K in plants. Estimation of S in plants.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-324      Lab in Pests of Crops and Stored Grains and their Management**  
**Credit 0-0-1**

Identification of different types of damage. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops; (b) Vegetable Crops; (c) Fruit Crops; (d) Plantation, gardens, Narcotics, spices & condiments. Identification of insect pests and Mites associated with stored grain. Determination of insect infestation by different methods. Assessment of losses due to insects. Calculations on the doses of insecticides application technique. Fumigation of grain store / godown. Identification of rodents and rodent control operations in godowns. Identification of birds and bird control operations in godowns. Determination of moisture content of grain. Methods of grain sampling under storage condition.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-325 Lab in Diseases of Field & Horticultural Crops & their Management-I**

**Credit 0-0-1**

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Collection and preservation of plant diseased specimens for Herbarium;

**Note:** Students should submit 50 pressed and well-mounted specimens/ photographs giving systematic position and brief description of symptoms.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-326**

**Lab in Crop Improvement – I (*Kharif*)**

**Credit 0-0-1**

Floral biology, emasculation and hybridization techniques in different crop species; viz., Rice, Jute, Maize, Sorghum, Pearl millet, Ragi, Pigeonpea, Urdbean, Mungbean, Soybean, Groundnut, Sesame, Caster, Cotton, Cowpea, Tobacco, Brinjal, Okra and Cucurbitaceous crops. Maintenance breeding of different *kharif* crops. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed descent methods; Study of field techniques for seed production and hybrid seeds production in *Kharif* crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments; Study of quality characters, donor parents for different characters;

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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-327      Lab in Entrepreneurship Development and Business Communication**

**Credit 0-0-1**

Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement motivation, exercise in creativity, time audit through planning, monitoring and supervision, identification and selection of business idea, preparation of business plan and proposal writing,

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-328            Lab in Geoinformatics, Nano-Technology and Precision Farming**

**Credit 0-0-1**

Introduction to GIS software, spatial data creation and editing. Introduction to image processing software. Visual and digital interpretation of remote sensing images. Generation of spectral profiles of different objects. Supervised and unsupervised classification and acreage estimation. Multispectral remote sensing for soil mapping. Creation of thematic layers of soil fertility based on GIS. Creation of productivity and management zones. Fertilizers recommendations based of VRT and STCR techniques. Crop stress (biotic/abiotic) monitoring using geospatial technology. Use of GPS for agricultural survey. Formulation, characterization and applications of nanoparticles in agriculture. Projects formulation and execution related to precision farming.



B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-329**

**Lab in Protected Cultivation**

**Credit 0-0-1**

Raising of seedlings and saplings under protected conditions, use of portrays in quality planting material production, Bed preparation and planting of crop for production, Inter cultural operations, Soil EC and pH measurement, Regulation of irrigation and fertilizers through drip, fogging ad misting.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-330**

**Lab in Micro Propagation Technique**

**Credit 0-0-1**

Identification and use of equipments in tissue culture Laboratory, Nutrition media composition, sterilization techniques for media, containers and small instruments, sterilization techniques for explants, Preparation of stocks and working solution, Preparation of working medium, Culturing of explants: Seeds, shoot tip and single node, Callus induction, Induction of somatic embryos regeneration of whole plants from different explants, Hardening procedures.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-331**

**Lab in Landscaping**

**Credit 0-0-1**

Identification of trees, shrubs, annuals, pot plants; Propagation of trees, shrubs and annuals, care and maintenance of plants, potting and repotting, identification of tools and implements used in landscape design, training and pruning of plants for special effects, lawn establishment and maintenance, layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house. Use of computer software, visit to important gardens/ parks/ institutes.

B.SC. (HONS.) AGRICULTURE SEMESTER-V  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-332**

**Lab in Hi-tech. Horticulture**

**Credit 0-0-1**

Types of polyhouses and shade net houses, Intercultural operations, tools and equipments identification and application, Micro propagation, Nursery-protrays, micro-irrigation, EC, pH based fertilizer scheduling, canopy management, visit to hi-tech orchard/nursery.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-351                      Rainfed Agriculture and Watershed Management**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershed in India; Problems and prospects of rainfed agriculture in India .

**Section-B**

Soil and climatic conditions prevalent in rainfed areas; Soil and water conservation techniques, Drought: types, effect of water deficit on physio-morphological characteristics of the plants, Crop adaptation and mitigation to drought.

**Section-C**

Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices, Management of crops in rainfed areas.

**Section-D**

Contingent crop planning for aberrant weather conditions, Concept, objective, principles and components of watershed management, factors affecting watershed management.

**B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**AGL-352  
Time: 3 Hours**

**Protected Cultivation and Secondary Agriculture**

**Credit 1-0-0  
Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes.

**Section-B**

Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house drying. Cost estimation and economic analysis.

**Section-C**

Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation.

**Section-D**

Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-353 Diseases of Field & Horticultural Crops & their Management-II**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Symptoms, etiology, disease cycle and management of following diseases:

**Section-A**

**Field Crops: Wheat:** rusts, loose smut, karnal bunt, powdery mildew, alternaria blight, and ear cockle; **Sugarcane:** red rot, smut, wilt, grassy shoot, ratoon stunting and Pokkah Boeng; **Sunflower:** Sclerotinia stem rot and Alternaria blight; **Mustard:** Alternaria blight, white rust, downy mildew and Sclerotinia stem rot.

**Section-B**

**Gram:** wilt, grey mould and Ascochyta blight; **Lentil:** rust and wilt; **Cotton:** anthracnose, vascular wilt, and black arm; **Pea:** downy mildew, powdery mildew and rust.

**Section-C**

**Horticultural Crops: Mango:** anthracnose, malformation, bacterial blight and powdery mildew; **Citrus:** canker and gummosis; **Grape vine:** downy mildew, powdery mildew and anthracnose; **Apple:** scab, powdery mildew, fire blight and crown gall; **Peach:** leaf curl. **Strawberry:** leaf spot

**Section-D**

**Potato:** early and late blight, black scurf, leaf roll, and mosaic; **Cucurbits:** downy mildew, powdery mildew, wilt; **Onion and garlic:** purple blotch, and Stemphylium blight; **Chillies:** anthracnose and fruit rot, wilt and leaf curl; **Turmeric:** leaf spot **Coriander:** stem gall Marigold: Botrytis blight; **Rose:** dieback, powdery mildew and black leaf spot.

**B.SC. (HONS.) AGRICULTURE SEMESTER-VI**  
**(CREDIT BASED EVALUATION AND GRADING SYSTEM)**  
**SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**AGL-354 Post-harvest Management and Value Addition of Fruits and Vegetables**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Importance of post-harvest processing of fruits and vegetables, extent and possible causes of post harvest losses.

**Section-B**

Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Harvesting and field handling.

**Section-C**

Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards.

**Section-D**

Drying/ Dehydration of fruits and vegetables –packaging of products.



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(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-355**

**Management of Beneficial Insects**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants.

**Section-B**

Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons. Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection.

**Section-C**

Species of lac insect, morphology, biology, host plant, lac production – seed lac, button lac, shellac, lac- products. Identification of major parasitoids and predators commonly being used in biological control.

**Section-D**

Insect orders bearing predators and parasitoids used in pest control and their mass multiplication techniques. Important species of pollinator, weed killers and scavengers with their importance.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-356**  
**Time: 3 Hours**

**Crop Improvement – II (*Rabi*)**

**Credit 1-0-0**  
**Marks: 100**  
**Mid Semester Marks: 20**  
**End Semester Marks: 80**  
**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fodder crops and cash crops; vegetable and horticultural crops.

**Section-B**

Plant genetic resources, its utilization and conservation; study of genetics of qualitative and quantitative characters.

**Section-C**

Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional).

**Section-D**

Hybrid seed production technology of *rabi* crops. Ideotype concept and climate resilient crop varieties for future.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-357**

**Principles of Organic Farming**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Organic farming, principles and its scope in India; Initiatives taken by Government (central/ state), NGOs and other organizations for promotion of organic agriculture.

**Section-B**

Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming.

**Section-C**

Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production; Operational structure of NPOP.

**Section-D**

Certification process and standards of organic farming; Processing, leveling, economic considerations and viability, marketing and export potential of organic products.

**B.SC. (HONS.) AGRICULTURE SEMESTER-VI**  
**(CREDIT BASED EVALUATION AND GRADING SYSTEM)**  
**SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**AGL-358 Farm Management, Production and Resource Economics**

**Time: 3 Hours**

**Credit 1-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms.

**Section-B**

Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and product-product relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage. Meaning and concept of cost, types of costs and their interrelationship.

**Section-C**

Importance of cost in managing farm business and estimation of gross farm income, net farm income, family labour income and farm business income Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts. Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting.

**Section-D**

Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies, Crop/livestock/machinery insurance – weather based crop insurance, features, determinants of compensation. Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-359**

**Principles of Food Science and Nutrition**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Concepts of Food Science (definitions, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems etc.).

**Section-B**

Food composition and chemistry (water, carbohydrates, proteins, fats, vitamins, minerals, flavours, colours, miscellaneous bioactives, important reactions).

**Section-C**

Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production of fermented foods); Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.).

**Section-D**

Food and nutrition, Malnutrition (over and under nutrition), nutritional disorders; Energy metabolism (carbohydrate, fat, proteins); Balanced/ modified diets, Menu planning, New trends in food science and nutrition.

**B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**AGL-360  
Time: 3 Hours**

**Agri-business Management**

**Credit 2-0-0  
Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Transformation of agriculture into agribusiness, various stakeholders and components of agribusiness systems. Importance of agribusiness in the Indian economy and New Agricultural Policy. Distinctive features of Agribusiness Management: Importance and needs of agro-based industries.

**Section-B**

Classification of industries and types of agro based industries. Institutional arrangement, procedures to set up agro based industries. Constraints in establishing agro-based industries. Agri-value chain: Understanding primary and support activities and their linkages. Business environment: PEST & SWOT analysis.

**Section-C**

Management functions: Roles & activities, Organization culture. Planning, meaning, definition, types of plans. Purpose or mission, goals or objectives, Strategies, policies procedures, rules, programs and budget. Components of a business plan, Steps in planning and implementation. Organization staffing, directing and motivation. Ordering, leading, supervision, communications, control. Capital Management and Financial management of Agribusiness. Financial statements and their importance.

**Section-D**

Marketing Management: Segmentation, targeting & positioning. Marketing mix and marketing strategies. Consumer behaviour analysis, Product Life Cycle (PLC). Sales & Distribution Management. Pricing policy, various pricing methods. Project Management definition, project cycle, identification, formulation, appraisal, implementation, monitoring and evaluation. Project Appraisal and evaluation techniques.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGL-361**

**Commercial Plant Breeding**

**Time: 3 Hours**

**Credit 2-0-0**

**Marks: 100**

**Mid Semester Marks: 20**

**End Semester Marks: 80**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Types of crops and modes of plant reproduction. Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production.

**Section-B**

Genetic purity test of commercial hybrids. Advances in hybrid seed production of maize, rice, sorghum, pearl millet, castor, sunflower, cotton pigeon pea, Brassica etc. Quality seed production of vegetable crops under open and protected environment.

**Section-C**

Alternative strategies for the development of the line and cultivars: haploid inducer, tissue culture techniques and biotechnological tools.

**Section-D**

IPR issues in commercial plant breeding: DUS testing and registration of varieties under PPV & FR Act. Variety testing, release and notification systems in India. Principles and techniques of seed production, types of seeds, quality testing in self and cross pollinated crops.

**B.SC. (HONS.) AGRICULTURE SEMESTER-VI**  
**(CREDIT BASED EVALUATION AND GRADING SYSTEM)**  
**SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**AGL-362**  
**Time: 3 Hours**

**Food Safety and Standards**

**Credit 2-0-0**  
**Marks: 100**  
**Mid Semester Marks: 20**  
**End Semester Marks: 80**  
**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

Food Safety – Definition, Importance, Scope and Factors affecting Food Safety. Hazards and Risks, Types of hazards - Biological, Chemical, Physical hazards. Management of hazards - Need. Control of parameters. Temperature control. Food storage. Product design.

**Section-B**

Hygiene and Sanitation in Food Service Establishments- Introduction. Sources of contamination and their control. Waste Disposal. Pest and Rodent Control. Personnel Hygiene. Food Safety Measures.

**Section-C**

Food Safety Management Tools- Basic concepts. PRPs, GHPs, GMPs, SSOPs etc. HACCP. ISO series. TQM - concept and need for quality, components of TQM, Kaizen. Risk Analysis. Accreditation and Auditing, Water Analysis, Surface Sanitation and Personal Hygiene. Food laws and Standards- Indian Food Regulatory Regime, FSSAI. Global Scenario CAC. Other laws and standards related to food.

**Section-D**

Recent concerns- New and Emerging Pathogens. Packaging, Product labeling and Nutritional labeling. Genetically modified foods\ transgenics. Organic foods. Newer approaches to food safety. Recent Outbreaks. Indian and International Standards for food products.



**B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**AGL-363****Agricultural Journalism****Time: 3 Hours****Credit 2-0-0****Marks: 100****Mid Semester Marks: 20****End Semester Marks: 80****Mid Semester Examination: 20% weightage****End Semester Examination: 80% weightage****Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**Section-A**

**Agricultural Journalism:** The nature and scope of agricultural journalism characteristics and training of the agricultural journalist, how agricultural journalism is similar to and different from other types of journalism.

**Section-B**

**Newspapers and magazines as communication media:** Characteristics; kinds and functions of newspapers and magazines, characteristics of newspaper and magazine readers. Form and content of newspapers and magazines: Style and language of newspapers and magazines, parts of newspapers and magazines.

**Section-C**

**The agricultural story:** Types of agricultural stories, subject matter of the agricultural story, structure of the agricultural story. **Gathering agricultural information:** Sources of agricultural information, interviews, coverage of events, abstracting from research and scientific materials, wire services, other agricultural news sources.

**Section-D**

**Writing the story:** Organizing the material, treatment of the story, writing the news lead and the body, readability measures. **Illustrating agricultural stories:** Use of photographs, use of artwork (graphs, charts, maps, etc.), writing the captions. **Editorial mechanics:** Copy reading, headline and title writing, proofreading, lay outting.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-371**

**Lab in Practical Crop Production-II (*Rabi Crops*)**

**Credit 0-0-2**

Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-372**

**Lab in Rainfed Agriculture and Watershed Management**

**Credit 0-0-1**

Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons. Studies on cropping pattern of different rainfed areas in the country and demarcation of rainfed area on map of India. Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops. Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation. Studies on cultural practices for mitigating moisture stress. Characterization and delineation of model watershed. Field demonstration on soil & moisture conservation measures. Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-373**

**Lab in Protected Cultivation and Secondary Agriculture**

**Credit 0-0-1**

Study of different type of green houses based on shape. Determine the rate of air exchange in an active summer winter cooling system. Determination of drying rate of agricultural products inside green house. Study of green house equipments. Determination of Moisture content of various grains by oven drying & infrared moisture methods. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-374      Lab in Diseases of Field & Horticultural Crops & their Management-II**

**Credit 0-0-1**

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems.

**Note:** Collection and preservation of plant diseased specimens for herbarium/photographs with systematic position and brief description of symptoms.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-375 Lab in Post-Harvest Management and Value Addition of Fruits and Vegetables**

**Credit 0-0-1**

Applications of different types of packaging, containers for shelf life extension. Effect of temperature on shelf life and quality of produce. Demonstration of chilling and freezing injury in vegetables and fruits. Extraction and preservation of pulps and juices. Preparation of jam, jelly, RTS, nectar, squash, tomato products. Quality evaluation of products -- physico-chemical and sensory. Visit to processing unit/ industry.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-376**

**Lab in Management of Beneficial Insects**

**Credit 0-0-1**

Honey bee species, castes of bees. Beekeeping appliances and seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Species of lac insect, host plant identification. Identification of other important pollinators, weed killers and scavengers. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies. Identification and techniques for mass multiplication of natural enemies.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-377**

**Lab in Crop Improvement – II (*Rabi*)**

**Credit 0-0-1**

Floral biology, emasculation and hybridization techniques in different crop species, namely, Wheat, Oat, Barley, Chickpea, Lentil, Field pea, Rajma, Horse gram, Rapeseed Mustard, Sunflower, Safflower, Potato, Berseem. Sugarcane, Tomato, Chilli, Onion; Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed descent methods; Study of field techniques for seed production and hybrid seeds production in *Rabi* crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments; Study of quality characters, study of donor parents for different characters.



B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-378**

**Lab in Principles of Organic Farming**

**Credit 0-0-1**

Visit of organic farms to study the various components and their utilization; Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis; Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management; Cost of organic production system; Post harvest management; Quality aspect, grading, packaging and handling.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-379            Lab in Farm Management, Production and Resource Economics**

**Credit 0-0-1**

Preparation of farm layout. Determination of cost of fencing of a farm. Computation of depreciation cost of farm assets. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources. Determination of most profitable level of inputs use in a farm production process. Determination of least cost combination of inputs. Selection of most profitable enterprise combination. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-380**

**Lab in Agri-business Management**

**Credit 0-0-1**

Study of agri-input markets: Seed, fertilizers, pesticides. Study of output markets: grains, fruits, vegetables, flowers. Study of product markets, retails trade commodity trading, and value added products. Study of financing institutions- Cooperative, Commercial banks, RRBs, Agribusiness Finance Limited, NABARD. Preparations of projects and Feasibility reports for agribusiness entrepreneur. Appraisal/evaluation techniques of identifying viable project- Non-discounting techniques. Case study of agro-based industries. Trend and growth rate of prices of agricultural commodities. Net present worth technique for selection of viable project. Internal rate of return.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-381**

**Lab in Commercial Plant Breeding**

**Credit 0-0-1**

Floral biology in self and cross pollinated species, selfing and crossing techniques. Techniques of seed production in self and cross pollinated crops using A/B/R and two line system. Learning techniques in hybrid seed production using male-sterility in field crops. Understanding the difficulties in hybrid seed production, Tools and techniques for optimizing hybrid seed production. Concept of rouging in seed production plot. Concept of line its multiplication and purification in hybrid seed production. Role of pollinators in hybrid seed production. Hybrid seed production techniques in sorghum, pearl millet, maize, rice, rapeseed-mustard, sunflower, castor, pigeon pea, cotton and vegetable crops. Sampling and analytical procedures for purity testing and detection of spurious seed. Seed drying and storage structure in quality seed management. Screening techniques during seed processing viz., grading and packaging. Visit to public private seed production and processing plants.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-382**

**Lab in Food Safety and Standards**

**Credit 0-0-1**

Water quality analysis physico-chemical and microbiological. Preparation of different types of media. Microbiological Examination of different food samples. Assessment of surface sanitation by swab/rinse method. Assessment of personal hygiene. Biochemical tests for identification of bacteria. Scheme for the detection of food borne pathogens. Preparation of plans for Implementation of FSMS - HACCP, ISO: 22000.

B.SC. (HONS.) AGRICULTURE SEMESTER-VI  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**AGP-383**

**Lab in Agricultural Journalism**

**Credit 0-0-1**

Practice in interviewing. Covering agricultural events. Abstracting stories from research and scientific materials and from wire services. Writing different types of agricultural stories. Selecting pictures and artwork for the agricultural story. Practice in editing, copy reading, headline and title writing, proofreading, layouting. Testing copy with a readability formula. Visit to a publishing office.

B.SC. (HONS.) AGRICULTURE SEMESTER-VII  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024

**Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE & AIA)**

| Sr. No. | Course Code | Training Components   | Number of weeks |
|---------|-------------|---|-----------------|
| 1.      | AGE-401     | General orientation & on Campus training by different faculties.  | 1               |
| 2.      | AGP-421     | Plant Clinic (ENTO+PPATH+HORT+AGRON+SSAC)   | 2               |
| 3.      | AGE-402     | Research Station/KVK/ including village attachment and <i>In-situ</i> interaction of farmers, students and research station scientists. | 8               |
|         |             | Unit attachment in KVK/Research station   | 5               |
| 4.      | AGE-403     | Agro-Industrial Attachment  | 3               |
| 5.      | AGD         | Project Report Preparation and Evaluation   | 1               |
|         |             | <b>Total</b>  |                 |

**Agro- Industrial Attachment:** The students would be attached with the agro-industries for a period of 3 weeks to get an experience of the industrial environment and working.

**Village Attachment Training Programme**

| S.No | Activity   | Duration      |
|------|--|---------------|
| 1.   | Orientation and Survey of Village                          | <b>1 Week</b> |
| 2.   | Agronomical Interventions                                  | <b>1 Week</b> |
| 3.   | Plant Protection Interventions                             | <b>1 Week</b> |
| 4.   | Soil Improvement Interventions (Soil sampling and testing) | <b>1 Week</b> |
| 5.   | Fruit and Vegetable production interventions               | <b>1 Week</b> |
| 6.   | Food Processing and Storage interventions                  | <b>1 Week</b> |
| 7.   | Animal Production Interventions                            | <b>1 Week</b> |
| 8.   | Extension and Transfer of Technology activities            | <b>1 Week</b> |

**B.SC. (HONS.) AGRICULTURE SEMESTER-VII  
(CREDIT BASED EVALUATION AND GRADING SYSTEM)  
SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**Agro Industrial Attachment**

Students shall be placed in Agro-and Cottage industries and Commodities Boards for 03 Weeks Industries include Seed/Sapling production, Pesticides- insecticides, Post harvest- processing value addition. Agri- finance institutions, etc.

| <b>S.No.</b> | <b>Activites and Task during Agro-Industrial Attachment Programme</b>  |
|--------------|--|
| 10           | Acquaintance with industry and staff   |
| 11           | Study of Structure, functioning objective and mandates of the industry   |
| 12           | Study of various processing units and hands-on trainings under supervision of industry staff                       |
| 13           | Ethics of Industry   |
| 14           | Employment generated by industry   |
| 15           | Contribution of the industry promoting environment   |
| 16           | Learning business network including outlets of the industry Skill development in all crucial tasks of the industry |
| 17           | Documentation of the activities and task performed by the students   |
| 18           | Performance evaluation, appraisal and ranking of students  |



**B.SC. (HONS.) AGRICULTURE SEMESTER-VIII**  
**(CREDIT BASED EVALUATION AND GRADING SYSTEM)**  
**SYLLABUS FOR THE BATCH FROM YEAR 2020 TO YEAR 2024**

**Experiential Learning Programmes**

**Modules for skill development and entrepreneurship.** A student has to register for two modules from the following package of modules: (Any two)

| <b>Sr. No.</b> | <b>Course Code</b> | <b>Experiential Learning Modules/</b>               | <b>Credits</b> |
|----------------|--------------------|---|----------------|
|                |                    | <b>Any two of the following options: -</b>          |                |
|                | AGP-451            | Production Technology Bio-agents and Bio-fertilizer | 10             |
|                | AGP-452            | Mushroom Cultivation Technology                     | 10             |
|                | AGP-453            | Soil, Plant, Water and Seed Testing                 | 10             |
|                | AGP-454            | Commercial Beekeeping                               | 10             |
|                | AGP-455            | Floriculture and Landscaping                        | 10             |
|                | AGP-456            | Commercial Horticulture                             | 10             |
|                | AGP-457            | Food Processing                                     | 10             |
|                | AGP-458            | Organic Production Technology                       | 10             |
|                |                    | <b>Total</b>  |                |