# FACULTY OF LIFE SCIENCES

## SYLLABUS
## of
## B.Sc. (Hons.) Agriculture

**(Semester I -IV)**

**(Under Continuous Evaluation Grading System)**

**Examination: 2019-20**

## The Heritage Institution

# KANYA MAHA VIDYALAYA
# JALANDHAR
# (Autonomous)

# Kanya Maha Vidyalya, Jalandhar (Autonomous)

## CURRICULUM AND SCHEME OF EXAMINATIONS OF FOUR YEAR DEGREE PROGRAMME

### B.Sc. (Hons.) Agriculture

### Session – 2019-20

| Course code | Course Name | Course Type | Marks | | | | Periods/Week | | Examination time (in hrs) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | Mode of Assessment | | | L | P | |
| | | | | External | | Internal | | | |
| | | | | L | P | CA | | | |
| BACL-1421<br><br>BACL-1031<br>BACL-1431 | Punjabi (Compulsory)<br>Basic Punjabi<br>PHC | C | 50 | 40 | - | 10 | 3 | 3 | 3+3 |
| BACL-1102 | Communication Skills in English-I | C | 50 | 40 | - | 10 | 3 | 3 | 3+3 |
| BACM-1013 | Fundamentals of Horticulture | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-1074 | Fundamentals of Plant Pathology | C | 100 | 60 | 20 | 20 | 4 | 3 | 3+3 |
| BACM-1015 | Fundamentals of Soil Sciences | C | 75 | 40 | 20 | 15 | 3 | 3 | 3+3 |
| BACM-1016 | Introduction to Forestry | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-1017 | Fundamentals of Agronomy | C | 100 | 60 | 20 | 20 | 4 | 3 | 3+3 |
| BACL-1018 | Rural Sociology & Educational Psychology | C | 50 | 40 | - | 10 | 3 | - | 3 |
| BACM-1059/<br>BACL-1339 | Introductory Biology/<br>Elementary Mathematics | C | 50/<br><br>50 | 25<br><br>40 | 15<br><br>- | 10<br><br>10 | 2<br><br>3 | 3<br><br>- | 3+3<br><br>3 |
| BACL-1010 | Agriculture Heritage | C | 25 | 20 | - | 5 | 2 | - | 3 |
| SECH-1543 | *Human Values & Ethics | AC | 25 | 20 | - | 5 | 2 | - | 3 |
| AECD-1161 | *Drug Abuse: Problem Management & Prevention (Compulsory) | AC | 50 | 40 | - | 10 | 3 | - | 3 |
| SECF-1492 | *Foundation Programme | AC | 25 | 25 | - | - | 2 | - | 3 |
| **Grand Total** | | | **600** | | | | | | |

**C-Compulsory**

**E-Elective**

**AC-Audit Course**

**[1]Special paper in lieu of Punjabi (Compulsory).**

**[2]Special paper in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.**

*** Marks of these papers will not be added in total marks and only grades will be provided.**

# B.Sc. (Hons.) Agriculture (Session: 2019-20)

| Course code | Course Name | Course Type | Marks | | | | Periods/Week | | Examination time (in hrs) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | Mode of Assessment | | | L | P | |
| | | | | External | | Internal | | | |
| | | | | L | P | CA | | | |
| BACL-2421<br><br>BACL-2031<br>BACL-2431 | Punjabi (Compulsory)<br>Basic Punjabi<br>PHC | C | 50 | 40 | - | 10 | 3 | 3 | 3+3 |
| BACM-2102 | Communication Skills in English-II | C | 50 | 25 | 15 | 10 | 3 | 3 | 3+3 |
| BACM-2063 | Fundamentals of Plant Biochemistry & Biotechnology | C | 75 | 40 | 20 | 15 | 3 | 3 | 3+3 |
| BACM-2014 | Agricultural Microbiology | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-2015 | Introductory Soil & Water conservation Engineering | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-2016 | Fundamentals of Crop Physiology | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACL-2177 | Fundamentals of Agricultural Economics | C | 50 | 40 | - | 10 | 3 | - | 3 |
| BACM-2018 | Fundamentals of Genetics | C | 75 | 40 | 20 | 15 | 3 | 3 | 3+3 |
| BACM-2019 | Fundamentals of Entomology | C | 100 | 60 | 20 | 20 | 4 | 3 | 3+3 |
| BACM-2010 | Fundamentals of Agricultural Extension Education | C | 75 | 40 | 20 | 15 | 3 | 3 | 3+3 |
| AECD-2161 | *Drug Abuse: Problem Management & Prevention (Compulsory) | AC | 50 | 40 | - | 10 | 3 | - | 3 |
| SECM-2502 | *Moral Education Programme | AC | 25 | 25 | - | - | 2 | - | 1 |
| **Grand Total** | | | **625** | | | | | | |

**C-Compulsory**

**E-Elective**

**AC-Audit Course**

**[1]Special paper in lieu of Punjabi (Compulsory).**

**[2]Special paper in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.**

*** Marks of these papers will not be added in total marks and only grades will be provided.**

**B.Sc. (Hons.) Agriculture**

**(Session: 2019-20)**

## ProgrammeSpecificOutcomes(PSO)–

Upon successful completion of this course, students will be able to:

**PSO1.** acquire, integrate, and apply the plant-science knowledge in a holistic manner needed for agriculturists.

**PSO2**. develop interdisciplinary knowledge and have the ability to actually perform physical tasks that require practice and training .

**PSO3**. develop creative skills to solve problems and improve current systems and can intervene to make improvements or correct deficiencies.

**PSO4**.developed leadership skills and exhibit a high level of professionalism and effective communication.

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**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1421**

# PUNJABI (COMPULSORY)

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

CO1:ਆਤਮ ਅਨਾਤਮ' ਪੁਸਤਕ ਦੇ ਕਵਿਤਾ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਵਿਤਾ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤਾਂ ਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚੱਲ ਰਹੀਆਂ ਕਾਵਿ ਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਕਰ ਸਕਣ।

CO2:ਇਸ ਦਾ ਹੋਰ ਮਨੋਰਥ ਕਵਿਤਾ ਦੀ ਵਿਆਖਿਆ, ਵਿਸ਼ਲੇਸ਼ਣ ਤੇ ਮੁਲੰਕਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ ਵੀ ਹੈ ਤਾਂ ਕਿ ਉਹ ਸਮਕਾਲੀ ਸਮਾਜ ਦੀਆਂ ਸਮੱਸਿਆਵਾਂ ਨੂੰ ਸਮਝ ਸਕਣ ਅਤੇ ਆਲੋਚਨਾਤਮਕ ਦ੍ਰਿਸ਼ਟੀ ਬਣਾ ਸਕਣ।

**CO3:ਇਤਿਹਾਸਕ ਯਾਦਾਂ** (ਇਤਿਹਾਸਕਲੇਖ ਸੰਗ੍ਰਹਿ)ਪੁਸਤਕ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਮੁੱਲਵਾਨ ਇਤਿਹਾਸ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ ਹੈ।

CO4:ਪੈਰ੍ਹਾ ਰਚਨਾ ਅਤੇ ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ ਦੇਣ ਦਾ ਮਨਰੋਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO5:ਧੁਨੀ ਵਿਉਂਤ ਪੜ੍ਹਣ ਨਾਲ ਵਿਦਿਆਰਥੀ ਧੁਨੀਆਂ ਦੀ ਉਚਾਰਨ ਪ੍ਰਣਾਲੀ ਤੋਂ ਵਾਕਫ਼ ਹੋਣਗੇ।

CO6:ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ - ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1421**

# PUNJABI (COMPULSORY)

**Max. Marks: 50**

**ਸਮਾਂ :** 3 ਘੰਟੇ **Theory :40**

**C.A. : 10**

**ਪਾਠ ਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ**

**ਸੈਕਸ਼ਨ-ਏ**

**ਆਤਮ ਅਨਾਤਮ** (ਕਵਿਤਾ ਭਾਗ),(ਸੰਪ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ) ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

**ਸੈਕਸ਼ਨ-ਬੀ**

**ਇਤਿਹਾਸਕ ਯਾਦਾਂ** (ਇਤਿਹਾਸਕਲੇਖ ਸੰਗ੍ਰਹਿ)ਸੰਪਾ. ਸ.ਸ.ਅਮੋਲ,ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ। (ਲੇਖ 1 ਤੋਂ 6)

**ਸੈਕਸ਼ਨ-ਸੀ**

**(ੳ)**ਪੈਰ੍ਹਾ ਰਚਨਾ

**(ਅ)**ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ। 08 ਅੰਕ

**ਸੈਕਸ਼ਨ-ਡੀ**

**(ੳ)ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ :** ਉਚਾਰਨ ਅੰਗ, ਉਚਾਰਨ ਸਥਾਨ ਤੇ ਵਿਧੀਆਂ, ਸਵਰ, ਵਿਅੰਜਨ, ਸੁਰ-ਪ੍ਰਬੰਧ।

**(ਅ)ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ** : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ੍ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣਚਿੰਨ੍ਹ। 08 ਅੰਕ

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।

4. ਪੇਪਰ ਸੈਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੋਂ ਵਧ ਤੋਂ ਵਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1031**

**BASIC PUNJABI (**ਮੁਢਲੀ ਪੰਜਾਬੀ)

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:ਮੁੱਢਲੀਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਸਿਖਾਉਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਪਾ ਕੇ ਇਕ ਹੋਰ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦੇ ਮੌਕੇ ਪ੍ਰਦਾਨ ਕਰਨਾ ਹੈ।**

**CO2:ਇਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਨੂੰ ਬਾਰੀਕਬੀਨੀ ਨਾਲ ਭਾਸ਼ਾ ਦਾ ਅਧਿਐਨ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।**

**CO3:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।**

**CO4:ਮੁੱਢਲੀਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਬਾਰੇ ਦੱਸਣਾ ਹੈ।**

**CO5:ਮੁੱਢਲੀਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦਾ ਸ਼ਬਦ ਘੇਰਾ ਵਿਸ਼ਾਲ ਕਰਨਾ ਹੈ।**

**CO6:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਵਿਚ**ਹਫ਼ਤੇ ਦੇ ਸਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰ੍ਹਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁੱਤਾਂ ਦੇ ਨਾਂ, ਇਕ ਤੋਂ ਸੌ ਤਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂ ਵਿਚ ਸਿਖਾਉਣਾ ਹੈ।

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1031**

# BASIC PUNJABI (ਮੁਢਲੀ ਪੰਜਾਬੀ)

**Max. Marks: 50**
**Time: 3 Hrs.** **Theory: 40**
**C.A. : 10**

**ਸੈਕਸ਼ਨ ਏ**

ਪੈਂਤੀ ਅਖਰੀ, ਅਖਰ ਕ੍ਰਮ, ਪੈਰ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ ਅਤੇ ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ ਅਤੇ ਮਾਤ੍ਰਵਾਂ (ਮੁਢਲੀ ਜਾਣ ਪਛਾਣ) ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿਪੀ, ਅਧਕ) : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ।

08ਅੰਕ

**ਸੈਕਸ਼ਨ ਬੀ**

ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਮੁਢਲੀ ਜਾਣ ਪਛਾਣ (ਸਾਧਾਰਨ ਸ਼ਬਦ, ਸੰਯੁਕਤ ਸ਼ਬਦ, ਮਿਸ਼ਰਤ ਸ਼ਬਦ, ਮੂਲ ਸ਼ਬਦ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ) 08ਅੰਕ

**ਸੈਕਸ਼ਨ ਸੀ**

ਨਿਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ : ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਰਿਸ਼ਤੇਨਾਤੇ, ਖੇਤੀ ਅਤੇ ਹੋਰ ਧੰਦਿਆਂ ਆਦਿ ਨਾਲ ਸੰਬੰਧਤ। 08 ਅੰਕ

**ਸੈਕਸ਼ਨ ਡੀ**

ਹਫ਼ਤੇ ਦੇ ਸਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰ੍ਹਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁਤਾਂ ਦੇ ਨਾਂ, ਇਕ ਤੋਂ ਸੌ ਤਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂ ਵਿਚ ।

08ਅੰਕ

## ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਯੂਨਿਟ ਹੋਣਗੇ। ਹਰ ਯਨਿਟ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਅੱਠ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੋਂ ਵਧ ਤੋਂ ਵਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1431**

# PUNJAB HISTORY & CULTURE (FROM EARLIEST TIMES TO C 320)

**(Special Paper in lieu of Punjabi compulsory)**

## COURSE OUTCOMES (CO):

After completing Semester I and course on Punjab History and Culture Students of History will be able to identify a complete grasp on the sources & writings of Ancient Indian History of Punjab.

CO1. Identify and describe the emergence of earliest civilizations in: Indus Valley Civilizationand Aryan Societies.

CO2. Identify and analyse the Buddhist, Jain and Hindu faith in the Punjab

CO3. Analyse the emergence of Early Aryans and Later Vedic Period, their Society, Culture, Polity andEconomy.

CO4. To make students understand the concepts of two faiths Jainism and Buddhism, its principles and their application in present times.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1431**

# Punjab History & Culture (From Earliest Times to C 320)

**(Special Paper in lieu of Punjabi compulsory)**

**Time: 3 Hours** **Max. Marks: 50**

**Theory: 40**
**CA: 10**

**Instructions for the Paper Setters**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

**Unit A**

1. Physical features of the Punjab and impact on history.
2. Sources of the ancient history of Punjab

**Unit- B**

3. Harappan Civilization: Town planning; social, economic and religious life of the India Valley People.
4. The Indo-Aryans: Original home and settlement in Punjab.

**Section C**

5. Social, Religious and Economic life during later *Rig* Vedic Age.
6. Social, Religious and Economic life during later Vedic Age.

**Section D**

7. Teaching and impact of Buddhism
8. Jainism in the Punjab

**Suggested Readings**


1. L. Joshi (ed): *History and Culture of the Punjab*, Art-I, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed); *History of Punjab*, Vol.I, Patiala 1977.
3. Budha Parkash: *Glimpses of Ancient Punjab*, Patiala, 1983.
4. B.N. Sharma: *Life in Northern India*, Delhi. 1966.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1102**

# COMMUNICATION SKILLS IN ENGLISH

**COURSE OUTCOMES (CO):**

After passing this course the student will be able to:

**CO1:** develop reading skills that will facilitate them to become an efficient reader.

**CO2:** realise not only language productivity but also the pleasure of being articulate as well.

**CO3:** develop a comprehensive understanding of the ideas in the text and enhance their critical thinking.

**CO4:** develop the writing skills proficiently to express ideas in clear and grammatically correct English.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1102**

**SEMESTER I**

**COMMUNICATION SKILLS IN ENGLISH**

**COURSE CODE: BACL/ BOPL/BOML/ -1102**

**COURSE OUTCOMES**

At the end of this course, the students will develop the following Skills:

**CO 1:** Reading skills that will facilitate them to become an efficient reader

**CO 2:** The ability torealise not only language productivity but also the pleasure of being able to articulate well

**CO 3:** The power to analyse, interpret and infer the ideas in the text

**CO 4:** The ability to have a comprehensive understanding of the ideas in the text and enhance their critical thinking

**CO 5:** Writing skills of students which will make them proficient enough to express ideas in clear and grammatically correct English

**CO 6:** Ability to plan, organise and present ideas coherently on a given topic

**CO 7:** The skill to use an appropriate style and format in writing letters (formal and informal)

**SEMESTER I**

**COMMUNICATION SKILLS IN ENGLISH**

**Course Code: BACL/ BOPL/BOML/ -1102**

**Time: 3 Hours**

**Max. Marks: 50**
**Theory: 40**
**Continuous Assessment: 10**

**Instructions for the paper setter and distribution of marks:**

**The question paper will consist of four sections and distribution of marks will be as under:**

**Section-A:** The question of theoretical nature will be set from Unit I of the syllabus with internal choice and it will consist of 8 marks.

**Section-B:** Two comprehension passages will be given to the students based on the Unit II and the candidates will have to attempt one carrying 8 marks.

**Section-C:** Two questions will be given based on the topics given in the Unit III and the candidates will have to attempt one carrying 8 marks.

**Section-D:** One out of the two questions will have to be attempted by the candidates based on the topics given in Unit IV of the syllabus. It will carry 8 marks.

**Important Note:**

**The candidate will have to attempt five questions in all selecting one from each section of the question paper and the fifth question may be attempted from any of the four sections.**

**(8 x 5 = 40)**

**The syllabus is divided in four units as mentioned below:**

**Unit I**

**Reading Skills**: Reading Tactics and strategies; Reading purposes–kinds of purposes andassociated comprehension; Reading for direct meanings.

**Unit II**

Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions

**Activities:**

- Comprehension questions in multiple choice format
- Short comprehension questions based on content and development of ideas

## Unit III

**Writing Skills**: Guidelines for effective writing; writing styles for application,personal letter, official/ business letter.

**Activities**

- Formatting personal and business letters.
- Organising the details in a sequential order

## Unit IV

Resume, memo, notices etc.; outline and revision.

**Activities:**

- Converting a biographical note into a sequenced resume or vice-versa
- Ordering and sub-dividing the contents while making notes.
- Writing notices for circulation/ boards

**Recommended Books:**

1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
2.*Business Communication,* by Sinha, K.K. Galgotia Publishers, 2003.
3. *Business Communication* by Sethi, A and Adhikari, B., McGraw Hill Education 2009.
4. *Communication Skills* by Raman, M. & S. Sharma, OUP, New Delhi, India (2011).
5. *English Grammar in Use: A Self Study Reference and Practice Book Intermediate Learners Book* by Raymond Murphy, Cambridge University Press.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1013**

# FUNDAMENTALS OF HORTICULTURE

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** understand horticulture, its branches, importance and scope.

**CO2**: understand botanical classification; climate, soil, irrigation methods and fertilizer application of horticultural plants.

**CO3**: understand plant propagation-methods and propagating structures.

**CO4**: understand plant physiological aspects from seed germination to seed formation

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1013**

# FUNDAMENTALS OF HORTICULTURE

**(THEORY)**

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 25**

**Practical: 15**

**C.A:10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## Unit – I

Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification; climate and soil for horticultural crops.

## Unit – II

Plant propagation-methods and propagating structures; Seed dormancy, Seed germination, principles of orchard establishment; Principles and methods of training and pruning.

## Unit – III

Juvenility and flower bud differentiation; unfruitfulness; pollination, pollinizers and pollinators; fertilization and parthenocarpy.

## Unit – IV

Medicinal and aromatic plants; importance of plant bio-regulators in horticulture. Irrigation – methods, Fertilizer application in horticultural crops.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1013**

# FUNDAMENTALS OF HORTICULTURE

**(PRACTICAL)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1**: apply concepts of horticulture science to select, manage, and improve plants and their products.

**CO2**: demonstrate competence with laboratory and/or field-based technologies used in modern horticulture.

**CO3:** gain skills for nursery and orchard establishment.

**CO4:**.quantify economic importance of plants in managed ecosystems and the impact of horticultural crops in food system.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1013**

# FUNDAMENTALS OF HORTICULTURE

## (PRACTICAL)

**Time: 3Hrs** **Marks: 15**

**Instructions for Practical Examiner: Question** paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya, and Jalandhar.

## LIST OF EXPERIMENTS

1. Identification of garden tools.
2. Identification of horticultural crops.
3. Preparation of seed bed/nursery bed and sowing of vegetable seeds.
4. Practice of sexual and asexual methods of propagation
5. Exc.4 Continued
6. Micro-propagation.
7. Layout and planting of orchard.
8. Layout of nutrition garden
9. Training and pruning of fruit trees.
10. Preparation of potting mixture.
11. Fertilizer application in different crops.
12. Layout of model nursery
13. Visits to commercial nurseries/orchard.

## SUGGESTED READINGS:


1. Chadha, K.L. , Handbook of Horticulture , ICAR, NewDelhi, 2002
2. Dhaliwal M.S., Handbook of vegetable crops, Kalyani Publishers, Ludhiana, 2008.
3. Jitendra Singh, Basic Horticulture, Kalyani Publishers, Ludhiana, 2011.
4. Gopalaswami, I. *Complete Gardening in India* - ICAR New Delhi, 2009.
5. Perter, K.V. (2018). Basic of horticulture. NIPA


## REFERENCE


1. http://aggie-horticulture,tamu.edu/propagation/propagation.html
2. http://www/britannica.com/
3. http://www.horticulture.com.au/export/hmac.asp
4. http://www.horticultureworld.net/hort-india.htm

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1014**

# FUNDAMENTALS OF PLANT PATHOLOGY

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:**understand different disease causal agents, their characteristics and identification and classification.

**CO2:**understand how to identify and sustainability manages plant diseases in various production systems.

**CO3:** understand binomial system of nomenclature, rules of nomenclature, classification of fungi.

**CO4:** understand epidemiology -factors affecting disease development. Principles and methods of plant disease management.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1014**

# FUNDAMENTALS OF PLANT PATHOLOGY

**(THEORY)**

**Time: 3Hrs** **Max. Marks: 100**

**Theory: 60**

**Practical: 20**

**C.A. : 20**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## Unit-I

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, differentgroups: fungi, bacteria, fastidious vascular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseasescaused by them. Diseases and symptoms due to abiotic causes.

## Unit-II

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, replicationand transmission. Study of phanerogamic plant parasites.

## Unit-III

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.

## Unit-IV

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.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1014**

# FUNDAMENTALS OF PLANT PATHOLOGY (PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** understand different laboratory equipment and microscopy.

**CO2:**understand the principles of host-pathogen interactions and how diseases occur in plants.

**CO3:** understand the defense mechanisms plants have against plant pathogens and how to manipulate the host-pathogen interaction to reduce and manage diseases.

**CO4:** differentially diagnose the actual cause or pathogen and suggest management practices

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1014**
**Credit Hrs: 4(3+1)**

# FUNDAMENTALS OF PLANT PATHOLOGY (PRACTICAL)

**Time: 3Hrs** **Marks: 20**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office Kanya Maha Vidyalaya, Jalandhar.

## LIST OF EXPERIMENTS

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

## Suggested Readings


1. Pandey, B.P. (2001) Plant Pathology, S Chand
2. M.J. Carlile, S.C. Watkinson & G.W. Gooday (2001), The Fungi 2nd Ed., Academic Press.
3. G.N. Agrios (1997), Plant Pathology 4th Ed., Academic Press.
4. R.S. Mehrotra (1980) Plant Pathology Tata McGraw Hill New Delhi

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1014**
**Credit Hrs: 4(3+1)**

# FUNDAMENTALS OF SOIL SCIENCE

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1**: evaluate basic nature of soil, its physical and chemical properties in the context of soil health.

**CO2:** assess the importance of special variability on soil type

**CO3:** determine soil fertility andidentify nutrientdeficiency.

**CO4:** apply knowledge in reclamation of problematic soil.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1015**

# FUNDAMENTALS OF SOIL SCIENCE

**(THEORY)**

**Max. Marks: 75**
**Time: 3 Hrs.** **Theory: 40**
**Practical: 20**
**C.A. : 15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## Unit – I

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.

## Unit – II

Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity; Elementary knowledge of soil taxonomy classification and soils of India; Soil water retention, movement and availability; Soil air, composition, gaseous exchange, problem and plant growth,

## Unit – III

Soil temperature; source, amount and flow of heat in soil; effect on plant growth, Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability; soil colloids inorganic and organic; silicate clays: constitution and properties; sources of charge; ion exchange, cation exchange capacity, base saturation;

## Unit – IV

Soil organic matter: composition, properties and its influence on soil properties; humic substances - nature and properties; soil organisms: macro andmicroorganisms, their beneficial and harmful effects; Soil pollution - behaviour of pesticides and inorganic contaminants, prevention and mitigation of soil pollution.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1015**

# FUNDAMENTALS OF SOIL SCIENCE

**(PRACTICALS)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

CO1: understand the basic and applied chemical, physical, andbiological concepts in soil.

CO2: quantify the soil characteristics and identify the nutrient deficiencies

CO3: evaluate basic soil chemical properties in the context of soil

CO4: evaluate soil physical parameter important for plant growth

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**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1015**

# FUNDAMENTALS OF SOIL SCIENCE

**(PRACTICALS)**

**Time: 3Hrs** **Marks: 20**

**Instructions for Practical Examiner: Question** paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

## LIST OF EXPERIMENTS

1. Study of soil profile in field.
2. Study of soil sampling tools, collection of representative soil sample, its processing and storage.
3. Study of soil forming rocks and minerals.
4. Determination of soil density, moisture content and porosity.
5. Determination of soil texture by feel and Bouyoucos Methods.
6. Studies of capillary rise phenomenon of water in soil column and soil.water movement.
7. Determination of soil pH and electrical conductivity.
8. Determination of cation exchange capacity of soil.
9. Study of soil map.
10. Determination of soil colour.
11. Demonstration of heat transfer in soil.
12. Estimation of organic matter content of soil.

## SUGGESTED READINGS

1 Brady, N.C. and Weil, R.R., *The Nature and Properties of Soil:* Pearson Edn. Pvt. Ltd. New Delhi, 2002.

2 Oswal, M.C., *Soil Physics*, Oxford & IBH publishing Co.Pvt.Ltd.New Delhi, 1994.

3. Biswas, T.D., and Mukherjee, S.K., *Text book of soil science,* Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1997.

4. Troch, F.R. and Thompson, L.M*Soils and Soil Fertility*, Oxford Press.

## REFERENCE

1. http://newprairiepress.org/ebooks/15/
2. Soils Laboratory Manual, K-State Edition**Authors:** Colby J. Moorberg, David A. Crouse**Publication:** ***NPP eBooks***
3. An Open-Source Laboratory Manual for Introductory, Undergraduate ...
4. https://dl.sciencesocieties.org/publications/nse/pdfs/46/1/170013by CJ Moorberg - 2

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1016**

# INTRODUCTION TO FORESTRY

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

CO1: describe basic concept of forestry and Indian Forest Policies.

CO2: practice the regeneration of forest species.

CO3: perform measurement of various growth parameters of forest species.

CO4: apply concept of agri-silviculture for ensuring food security.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1016**

# INTRODUCTION TO FORESTRY

**(THEORY)**

**Max. Marks: 50**

**Time: 3 Hrs.** **Theory: 20**

**Practical: 15**

**C.A. : 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

**THEORY:**

**Unit – I**

Introduction – definitions of basic terms related to forestry, objectives of silviculture, forest classification, salient features of Indian Forest Policies.

**Unit – II**

Forest regeneration, Natural regeneration - natural regeneration from seed and vegetative parts, coppicing, pollarding, root suckers; Artificial regeneration – objectives, choice between natural and artificial regeneration, essential preliminary considerations.

**Unit – III**

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; 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.

**Unit – IV**

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.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1016**

# INTRODUCTION TO FORESTRY

**(PRACTICALS)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to

CO1: understand forest mensuration: objectives, diameter measurement, instruments used in diameter measurement.

CO2: understand instrumental methods of height measurement - geometric and trigonometric principles, instruments used in heightmeasurement.

CO3: understand tree stem form, form factor, form quotient, measurement of volume of felled and standing trees, age determination of trees.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1016**

# INTRODUCTION TO FORESTRY

**(PRACTICALS)**

**Time: 3Hrs** **Marks: 15**

**Instructions for Practical Examiner: Question** paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

## LIST OF EXPERIMENTS

1. Identification of tree-species.
2. Diameter measurements using calipers and tape.
3. Tree diameter measurements of forked, buttressed, fluted and leaning trees.
4. Exercise 3 continued
5. Height measurement of standing trees by shadow method, single pole method and hypsometer.
6. Exercise 5 continued
7. Volume measurement of logs using various formulae.
8. Nursery lay out, seed sowing,
9. Exercise 8 continued
10. Vegetative propagation techniques.
11. Forest plantations and their management. Visits of nearby forest based industries.
12. Visits of nearby forest based industries

## SUGGESTED READINGS


1. Kothari, A.S., A Celebration of Indian Trees, Marg Pub, New York, 2007.
2. Bore, N.L., A Manual of Indian Forest Botany, International Book Dist.New Delhi, 2008.
3. Diwivedi, A.P., A Text Book of Silviculture, International Book Distributor. New Delhi, 1993.
4. Negi. S.S. Hand Book of Forestry, IBD Publishers, Dehra Dun, 2008
5. Reddy, S.R and Nagamani, C. (2017). Introduction to forestry. Kalyani Publishers, New Delhi.


## REFERENCE


1.www.ITTI.com

2. www.swsc.com

3.www.Candia.co

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1017**

# FUNDAMENTALS OF AGRONOMY

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

CO1: explain the basic concepts of agronomic practices.

CO2: classify different agronomical crops and explain the tillage implements.

CO3: understand the production of technologies of major crops

CO4: identify the different types of cropping systems and constraints to efficient production of crops.

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**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1017**

# FUNDAMENTALS OF AGRONOMY

**(THEORY)**

**Time: 3 Hrs.** **Max. Marks: 100**

**Theory: 60**

**Practical: 20**

**C.A. : 20**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## Unit – I

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

## Unit – II

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

## Unit – III

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

## Unit – IV

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.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1017**

# FUNDAMENTALS OF AGRONOMY

**(PRACTICALS)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1**: develop skills to identify the soil moisture levels, seed germination factors

**CO2**: develop skills to use tillage equipment, herbicide and fertilizer application

**CO3**: understand weeds their importance, classification, crop weed competition, concepts of weed management, principles and methods.

**CO4**: herbicides their classification, selectivity and resistance, allelopathy.

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**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1017**

# FUNDAMENTALS OF AGRONOMY

**(PRACTICAL)**

**Time: 3Hrs** **Marks: 20**

**Instructions for Practical Examiner: Question** paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya,Jalandhar.

## LIST OF EXPERIMENTS

1. Identification of crops, seeds, fertilizers,
2. Pesticides, herbicides and implements.
3. Study of yield contributing characters and yield estimation,
4. Seed germination and viability test
5. Use of tillage implements-reversible plough, one way plough, harrow, leveler, seed drill,
6. Identification of weeds in crops.
7. Methods of herbicide and fertilizer application,
8. Study of yield contributing characters and yield estimation.
9. Seed germination and viability test.
10. Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement.
11. Use of tillage implements- plough, harrow, leveller and seed drill.
12. Study of soil moisture measuring devices and measurement of field capacity.
13. Measurement of soil infiltration rate and irrigation water..

## SUGGESTED READINGS


1. Reddy S.R., *Principles of Crop Husbandry,* Kalyani Publishers, Ludhiana, 2009.
2. Handbook of Agriculture, I.C.A.R. Publications, New Delhi, 2008.
3. *Weeds of North India* I.C.A.R. Publications, New Delhi, 2008.
4. *Package of Practices for Rabi and kharif crops,* P.A.U. Publications Ludhiana, corresponding year


## REFERENCE


www.tnau.com

krishikosh.egranth.ac.in

http://www.agriinfo.in/

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1018**

# RURAL SOCIOLOGY & EDUCATIONAL PSYCHOLOGY

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

CO1: comprehend the concept and principles of effective extension.

CO2: identify the organizational set up of agricultural extension.

CO3: become a team leader and be a project management specialist.

CO4: understand the concept of adoption diffusion of motivation, planning and evaluation.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1018**

# RURAL SOCIOLOGY & EDUCATIONAL PSYCHOLOGY

**(THEORY)**

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 40**

**C.A:10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

**Unit – I**

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

**Unit – II**

Rural society, Social Groups, Social Stratification, Culture concept,

**Unit – III**

Social Institution, Social Change & Development. Educational psychology: Meaning & its importance in agriculture extension.

**Unit – IV**

Behavior: Cognitive, affective, psychomotor domain, Personality, Learning, Motivation, Theories of Motivation, Intelligence.

**SUGGESTED READINGS**

1.Dubey, S.C., Tradition and Development. Vikas Publishing Home Pvt. Ltd. Jangpura, New Delhi.,2008
2.Gupta, D., Social Stratification. Oxford University Press, Delhi, 2004.

**REFERENCES**

1. http://www.agriinfo.in/default.aspx?page=topic&superid=7&topicid=516
2. http://www.yourarticlelibrary.com/sociology/rural-leadership-meaning-and-characteristics-of-rural-leadership/34944/
3. www.hillagric.ac.in/edu/coa/AgriEcoExtEduRSocio/lectures/Ext121.pd

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACM-1059**

# INTRODUCTORY BIOLOGY

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

CO1: understand the living world, diversity and characteristics of life, origin of life, evolution and eugenics.

CO2: understandbinomial nomenclature and classification cell and cell division.

CO3: understand morphology of flowing plants. Seed and seed germination.

CO4: understand plant systematic Brassicaceae, Fabaceae and Poaceae.

CO5: understand role of animals in agriculture.

# B.Sc. (Hons.) Agriculture (Semester – I)
# (Session 2019-20)
# INTRODUCTORY BIOLOGY

**Course Code: BACM-1059**

## Course Outcomes:

After passing this course the student will be able to:

CO1: Understand the living world, diversity and characteristics of life, origin of life, evolution and eugenics.

CO2: Understand binomial nomenclature and classification cell and cell division.

CO3: Understand morphology of flowing plants. Seed and seed germination.

CO4: Understand plant systematic Brassicaceae, Fabaceae and Poaceae.

CO5: Understand role of animals in agriculture.

**B.Sc. (Hons.) Agriculture (Semester – I)**
**Session 2019-20**
**INTRODUCTORY BIOLOGY**

**Course Code: BACM-1059**

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 25**
**Practical: 15**
**C.A:10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

**Unit – I**

Introduction to the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics.

**Unit – II**

Binomial nomenclature and classification Cell and cell division.

**Unit – III**

Morphology of flowing plants.Seed and seed germination.

**Unit – IV**

Plant systematic- viz; Brassicaceae, Fabaceae and Poaceae.Role of animals in agriculture.

**SUGGESTED READINGS**

1.Dutta, C., *Text book of Botany*, Oxford University Press- India, 2000.
2.Bhatia K.N. and Widge, R., *Introduction of Botany*, Truman Publishers, Jalandhar, 2010.
3.Vidyarthi, S., *Text book of Botany*, S. Chand and Company, New Delhi, 2002.
4.Frederick V.T., *A Text book of Agricultural Zoology*, General Books Publications, London, 2010

**B.Sc. (Hons.) Agriculture (Semester – I)**
**(Session 2019-20)**
**INTRODUCTORY BIOLOGY**

**Course Code: BACM-1059**

**Time: 3 Hrs.** **Marks: 15**

**Instructions for the Practical Examiners:** Question paper is to set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar

**PRACTICAL**

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

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1339**

# ELEMENTARY MATHEMATICS

**Course Outcomes**

After the successful Completion of this program the students will be able to

**CO 1**: Understand the concept of Distance formulae, equation of coordinate axes, equation of lines parallel to axes, slope and intercept form of equation of line and manage to find angles between the straight lines.

**CO 2**: Explain general equation of a circle and demonstrate equation of a circle passing through three given points.

**CO 3**: Understand the basis of matrices and algebra of matrices and apply determinants and its properties to find inverse of matrix up to $3^{rd}$ order.

**CO 4**: Recognize algebraic, exponential, logarithmic function and will come to know how to calculate their differentiation and apply derivatives of sum, difference, product and quotient of two functions.

**B.Sc. (Hons.) Agriculture (Semester–I)**
**(Session 2019-20)**

# ELEMENTARY MATHEMATICS

**Course Code: BACL-1339**

**Time: 3 Hours** **Max. Marks: 50**
**Theory: 40**
**CA:10**

**Instructions for the Paper Setters:**
Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## UNIT-I

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,
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.

## UNIT-II

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 $(x_1, y_1)$ & $(x_2,y_2)$.

## UNIT-III

Differential Calculus: Definition of function, limit and continuity of algebraic functions. 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.

## UNIT-IV

Matrix: Definition of Matrices, Addition, Subtraction, Multiplication, Transpose of matrix up to $3^{rd}$ order.Determinants: Properties of determinants and their evaluation, Inverse of matrix up to $3^{rd}$ order. Matrix method.

**Books Recommended:**


1. Hussain I. et. al. Mathematics, A textbook for class XI, NCERT.
2.Joshi, D.D. et. al. Mathematics, A textbook for class XII, NCERT.
3. Mathematical Hand Book: M. Vygodsky, Mir, Mascow, 1975.
4. Differential Calculus: Shanti Narayan, New Delhi, Shyam Lal, 1983.
5. Integral Calculus: Shanti Narayan, Delhi, S. Chand, 1968.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1010**

# AGRICULTURAL HERITAGE

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** understand the traditional Indian agriculture.

**CO2:** distinguish between past and current agriculture conditions.

**CO3:** differentiate between traditional and modern agricultural technologies.

**CO4:** elaborate the scope and future prospects of agricultural sciences

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: BACL-1010**

# AGRICULTURAL HERITAGE

**Time: 3 Hrs.** **Max. Marks: 25**

**Theory: 20**

**C.A.:5**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

**Unit – I**

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

**Unit – II**

Past and present status of agriculture and farmers in society; Journey of Indian agriculture and its development from past to modern era;

**Unit – III**

Plant production and protection through indigenous traditional knowledge; Crop voyage in India and world; Agriculture scope; Importance of agriculture and agricultural resources available in India;

**Unit – IV**

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

**SUGGESTED READINGS**


1. Nene,Y.L.,Choudhary ,S.L. Agricultural Heritage in India.(2004)
2. Saxena,R.C.,Choudhary S.L. and Nene Y.L. A Textbook on Ancient History of Indian Agriculture. (2009).
3. Kumari, D. and Veerpal M. Agricultural Heritage in India AGROTECH, India. (2012)
4. Choudhary,S.L. ,Asean Agri.History Foundation India (AHFI),(2004)


**REFERENCES**


1. eagri.tnau.ac.in/eagri50/AGRO102/lec11.pdf ,
2. http://www.kiran.nic.in/Agri-Heritage.html
3. https://en.wikipedia.org/wiki/Traditional_knowledg

**B.Sc. (Hons.) Agriculture (Semester –I)**
**(Session: 2019-20)**

**Course Code: SECH-1543**

# HUMAN VALUES AND ETHICS

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

CO1: understand universal human aspirations happiness and prosperity, human values and ethics.

.

CO2: understand fundamental values, ethics, ICT, sensitization towards others -senior citizens, developmentally challenged and gender.

CO3: understand spirituality, positive attitude and scientific temper, team work and volunteering.

CO4: understand rights andresponsibilities, human relations, family harmony, drug abuse problem and other social evils.

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**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: SECH-1543**

# HUMAN VALUES AND ETHICS

**(THEORY)**

**Time: 3 Hours** **Max. Marks: 25**

**Theory: 20**

**C.A.:5**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

**UNIT-I**

Universal human aspirations: Happiness and prosperity; Human values and ethics: Concept,definition, significance and sources.

**UNIT-II**

Fundamental values: Right conduct, peace, truth, love andnon-violence; Ethics: professional, environmental, ICT; Sensitization towards others particularlysenior citizens, developmentally challenged and gender.

**UNIT-III**

Spirituality, positive attitude and scientific temper; Team work and volunteering; Rights andresponsibilities; Road safety; Human relations and family harmony; Modern challenges and value conflict.

**UNIT-IV**

Sensitization against drug abuse and other social evils; Developing personal code ofconduct (SWOT Analysis); Management of anger and stress.

**References:**


1. Dr. Rajan Mishra, Human Values. Laxmi Publications Pvt. Ltd.
2. S. Dinesh Babu, Professional Ethics and Human Values. Laxmi Publications Pvt. Ltd.
3. P.S. Rathore, Business Ethics and Communication. S. Chand Publishing.
4. Dr. K. Alex. Manegerial Skills. S. Chand Publishing.
5. Dr. M. Adithan. Study skills for professional students for higher education. S. Chand Publishing.
6. R. R. Gaur and R. Sangal. A foundation course in Human Values and Professional Ethics.


**Websites:**

- www.tatamcgrawhill.com/digital Solutions/monopoly
- www.schandedutech.com
- www.laxmipublications.com

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: AECD-1161**

# DRUG ABUSE: PROBLEM MANAGEMENT AND PREVENTION

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1.**This information can include factual data about what substance abuse is; warning signs of addiction; information about how alcohol and specific drugs affect the mind and body;

**CO2**. How to be supportive during the detoxification and rehabilitation process.

**CO3.** Main focus of substance abuse education is teaching individuals about drug and alcohol abuse and how to avoid, stop, or get help for substance use disorders.

**CO4.**Substance abuse education is important for students alike; there are many misconceptions about commonly used legal and illegal substances, such as alcohol and marijuana.

**B.Sc. (Hons.) Agriculture (Semester –I)**

**(Session: 2019-20)**

**Course Code: AECD-1161**

# DRUG ABUSE: PROBLEM MANAGEMENT AND PREVENTION

**Time: 3 Hrs** **Max.Marks: 50**

**Theory: 40**

**CA: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## Unit I

**1)Meaning of Drug Abuse:** Concept and Overview, Historical Perspective of Drug Abuse, Drug Dependence, Drug Addiction, Physical and Psychological Dependence: Drug Tolerance and withdrawal symptoms.

## Unit II

**2) Types of Abused Drugs and their Effects -I**

1) Stimulants: Amphetamines – Benzedrine, Dexedrine, Cocaine.
2) Depressants: Alcohol Barbiturates: Nembutal, Seconal, Phenobarbital and Rohypnol.
3) Narcotics: Heroin, Morphine, Oxycodone.

## Unit III

**3) Types of abused drugs and their effects - II**

1) Hallucinogens: Cannabis, Marijuana, Hashish, Hash Oil, MDMA, LSD.
2) Steroids.

## Unit IV

**4) Nature and Extent of the Problem:** Magnitude or prevalence of the menace of Drug Abuse in India and Punjab, Vulnerable groups by age, gender and economic status, Signs and Symptoms of Drug Abuse: Physical, Academic, Behavioural and Psychological Indicators.

**References:**


1.Ahuja, Ram (2003), *Social Problems in India*, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3.Modi, Ishwar and Modi, Shalini (1997) *Drugs: Addiction and Prevention*, Jaipur: Rawat Publication.
6. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
7. Sain, Bhim 1991, *Drug Addiction Alcoholism,* Smoking obscenity New Delhi: Mittal Publications.
8. Sandhu, Ranvinder Singh, 2009, *Drug Addiction in Punjab*: A Sociological Study. Amritsar: Guru Nanak Dev University.
9. Singh, Chandra Paul 2000. *Alcohol and Dependence among Industrial Workers*: Delhi: Shipra.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACL-2421**

# PUNJABI (COMPULSORY)

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

CO1:ਆਤਮ ਅਨਾਤਮ ਪੁਸਤਕ ਦੇ ਕਹਾਣੀ ਭਾਗ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਹਾਣੀ ਨੂੰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਕਹਾਣੀ ਜਗਤ ਨਾਲ ਜੋੜਣਾ ਹੈ।

**CO2:ਇਤਿਹਾਸਕ ਯਾਦਾਂ** (ਇਤਿਹਾਸਕਲੇਖ ਸੰਗ੍ਰਹਿ)ਪੁਸਤਕ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਮੁੱਲਵਾਨ ਇਤਿਹਾਸ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ ਹੈ।

CO3:ਸੰਖੇਪ ਰਚਨਾ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸਮੇਂ ਅਤੇ ਮਿਹਨਤ ਦੀ ਬੱਚਤ ਕਰਨ ਬਾਰੇ ਦੱਸਣਾ ਹੈ।

CO4:ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ ਦੇਣ ਦਾ ਮਨਰੋਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO5:ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ ਪੜ੍ਹਣ ਨਾਲ ਵਿਦਿਆਰਥੀ ਇਸਦੇ ਮੁੱਢਲੇ ਸੰਕਲਪਾਂ ਨੂੰ ਆਧਾਰ ਬਣਾ ਕੇ ਇਹਨਾਂ ਸੰਕਲਪਾਂ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ ।

CO6:ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ - ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

**(Session: 2019-20)**

**Course Code: BACL-2421**

# PUNJABI (COMPULSORY)

**ਸਮਾਂ :** 3 ਘੰਟੇ

**Maximum Marks: 50**
**Theory: 40**
**C.A.:10**

## ਪਾਠ ਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

**ਸੈਕਸ਼ਨ-ਏ**

**ਆਤਮ ਅਨਾਤਮ** (ਕਹਾਣੀ ਭਾਗ),(ਸੰਪ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

**ਸੈਕਸ਼ਨ-ਬੀ**

**ਇਤਿਹਾਸਕ ਯਾਦਾਂ** (ਇਤਿਹਾਸਕ ਲੇਖ ਸੰਗ੍ਰਹਿ)ਸੰਪਾ. ਸ.ਸ.ਅਮੋਲ,ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ।

**ਸੈਕਸ਼ਨ-ਸੀ**

**(ੳ)ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ** : ਪਰਿਭਾਸ਼ਾ, ਮੁਢਲੇ ਸੰਕਲਪ

**(ਅ)** ਸ਼ਬਦਸ਼੍ਰੇਣੀਆਂ08 ਅੰਕ

**ਸੈਕਸ਼ਨ-ਡੀ**

**(ੳ)**ਸੰਖੇਪ ਰਚਨਾ

**(ਅ)** ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ 08 ਅੰਕ

## ਅੰਕਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।

4. ਪੇਪਰ ਸੈਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੋਂ ਵਧ ਤੋਂ ਵਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACL-2031**

# ਮੁੱਢਲੀ ਪੰਜਾਬੀ

**(In lieu of Compulsory Punjabi)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:ਮੁੱਢਲੀਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਸਿਖਾਉਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਪਾ ਕੇ ਇਕ ਹੋਰ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦੇ ਮੌਕੇ ਪ੍ਰਦਾਨ ਕਰਨਾ ਹੈ।**

**CO2:ਇਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਨੂੰ ਬਾਰੀਕਬੀਨੀ ਨਾਲ ਭਾਸ਼ਾ ਦਾ ਅਧਿਐਨ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।**

**CO3:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।**

CO4:ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ - ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

**CO5:ਮੁੱਢਲੀਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦਾ ਸ਼ਬਦ ਘੇਰਾ ਵਿਸ਼ਾਲ ਕਰਨਾ ਹੈ।**

CO6:ਵਿਦਿਆਰਥੀ ਵਾਕ ਦੀ ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਇਸਦੀ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ ਅਤੇ ਭਾਸ਼ਾ ਤੇ ਪਕੜ ਮਜਬੂਤ ਹੋਵੇਗੀ।

CO7:ਪੈਰ੍ਹਾ ਰਚਨਾ ਦਾ ਮਨਰੋਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO8:ਸੰਖੇਪ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਸੰਖੇਪ ਵਿਚ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ।

CO9:ਘਰੇਲੂ ਅਤੇ ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਲਿਖਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਸ ਕਲਾ ਵਿਚ ਨਿਪੁੰਨ ਕਰਨਾ ਹੈ।

CO10:ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਨਾਲ ਗੱਲਬਾਤ ਵਿਚ ਪਰਪੱਕਤਾ ਆਉਂਦੀ ਹੈ।ਇਹ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਗੱਲਬਾਤ ਵਿਚ ਨਿਖਾਰ ਲਿਆਉਣ ਦਾ ਕੰਮ ਕਰਨਗੇ।

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACL-2031**

# ਮੁੱਢਲੀ ਪੰਜਾਬੀ

**(In lieu of Compulsory Punjabi)**

**ਸਮਾਂ :** 3 **ਘੰਟੇ** **Maximum Marks: 50**

**Theory: 40**

**C.A.:10**

## ਪਾਠ ਕ੍ਰਮ

### ਸੈਕਸ਼ਨ ਏ

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

08 ਅੰਕ

### ਸੈਕਸ਼ਨ ਬੀ

ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ : ਮੁਢਲੀ ਜਾਣ ਪਛਾਣ

(ੳ) ਸਾਧਾਰਨ ਵਾਕ, ਸੰਯੁਕਤ ਵਾਕ ਅਤੇ ਮਿਸ਼ਰਤ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

(ਅ) ਬਿਆਨੀਆ ਵਾਕ, ਪ੍ਰਸ਼ਨਵਾਚਕ ਵਾਕ ਅਤੇ ਹੁਕਮੀ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

08 ਅੰਕ

### ਸੈਕਸ਼ਨ ਸੀ

ਪੈਰ੍ਹਾ ਰਚਨਾ

ਸੰਖੇਪ ਰਚਨਾ 08 ਅੰਕ

### ਸੈਕਸ਼ਨ ਡੀ

ਚਿਠੀ ਪੱਤਰ (ਘਰੇਲੂ ਅਤੇ ਦਫ਼ਤਰੀ)

ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ 08 ਅੰਕ

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਯੂਨਿਟ ਹੋਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।

4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੋਂ ਵਧ ਤੋਂ ਵਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACC- 2431**

# PUNJAB HISTORY & CULTURE

**(From Earliest Times to 1000 A.D)**

**(Special paper in lieu of Punjabi Compulsory)**

## COURSE OUTCOMES (CO):

After completing Semester II and course on Ancient History of Punjab, Students of History will be able to identify a complete grasp on the sources & writings of Ancient History of Punjab

CO1. analyse the emergence of Mauryan, Gupta empires during the classical age in India

CO2. understand the various factors leading to rise and fall of empires and emergence of new dynasties and their Culture, society, administration , polity and religion specifically of Kushans and Vardhanas in the Punjab

CO3. have thorough insight into the various forms/styles of Architecture and synthesis of Indo - Muslim Art and Architecture in Punjab

CO4. have grasp on the existing Literature of this period and understand the past developments in the light of present scenario.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACC- 2431**

# PUNJAB HISTORY & CULTURE

**(From Earliest Times to 1000 A.D)**

**(Special paper in lieu of Punjabi Compulsory)**

**Time: 3Hrs** **Max. Marks: 50**

**Theory: 40**

**C.A:10**

**Instructions for the Paper Setters**

**Question paper shall consist of four Units.Candidates shall attempt 5 questions in all, by at least selecting One Question from each unit and the 5th question may be attempted from any of the four sections.Each question will carry 8 marks.**

## Unit-I

1. Punjab under Chandragupta Maurya and Ashoka.
2. The Kushans and their Contribution to the Punjab.

## Unit -II

3. The Panjab under the Gurpta Emperor.
4. The Punjab under the Vardhana Emperors

## Unit-III

5. Political Developments 17th Century to 1000 A.D. (Survey of Political)
6. Socio-cultural History of Punjab from 7th to 1000 A.D.

## Unit -IV

7. Development of languages and Literature.
8. Development of art & Architecture

**Suggested Readings**


1. L. Joshi (ed): *History and Culture of the Punjab*, Art-I, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed); *History of Punjab*, Vol.I, Patiala 1977.
3. Budha Parkash:*Glimpses of Ancient Punjab*, Patiala, 1983.
4. B.N. Sharma: *Life in Northern India*, Delhi. 1966

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM- 2102**

**SEMESTER II**

**COMMUNICATION SKILLS IN ENGLISH**

**COURSE CODE: BACM/BOPM/ BOMM/ -2102**

**COURSE OUTCOMES**

At the end of this course, the students will develop the following skills:

**CO 1:** Enhancement of listening skills with the help of listening exercises based on conversation, news and TV reports

**CO 2:** Improvement of speaking skills enabling them to converse in a specific situation

**CO 3:** Acquisition of knowledge of phonetics which will help them in learning about correct pronunciation as well as effective speaking

**CO 4:** The capability to present themselves well in a job interview

**CO 5:** The ability of Note-Taking to be able to distinguish the main points from the supporting details and the irrelevant information from the relevant one

**CO 6:** Speaking skills of the students enabling them to take active part in group discussion and present their own ideas

**CO 7:** The capability of narrating events and incidents in a logical sequence

**SEMESTER-II**

**COMMUNICATION SKILLS IN ENGLISH**

**Course Code: BACM/BOPM/BOMM/ -2102**

**Time: 3 hours (Theory)**
**3 hours (Practical)**

**Max. Marks: 50**
**Theory: 25**
**Practical: 15**
**Continuous Assessment: 10**

**Instructions for the paper setters and distribution of marks:**

**The question paper will consist of four sections and distribution of marks will be as under:**

**Section-A:** Two questions with internal choice will be set from Unit I of the syllabus and these questions will be theoretical in nature corresponding to the syllabus of Section-I. Each will carry 5 marks.

**Section-B:** Two questions with internal choice will be set from Unit II of the syllabus. One will be theoretical and the second will be practical in nature. Each will carry 5 marks.

**Section-C:** Two questions with internal choice will be set from Unit III of the syllabus and these will be theoretical in nature. Each will carry 5 marks.

**Section-D:** Two questions with internal choice will be set from Unit IV of the syllabus. One question will be theoretical in nature and the other will be practical in nature (based on phonetic transcription and stress). Each will carry 5 marks.

**Important Note:**

**The candidate will have to attempt five questions in all selecting one from each section of the question paper and the fifth question may be attempted from any of the four sections. (5 x 5 = 25)**

## PRACTICAL / ORAL TESTING

**Time: 3 hours** **Marks: 15**

**Course Contents:**

1. Oral Presentation with/without audio visual aids.
2. Group Discussion.
3. Listening to any recorded or live material and asking oral questions for listening comprehension.

**Questions:**

1. Oral Presentation will be of 5 to 7 minutes duration. (Topic can be given in advance or it can be of student's own choice). Use of audio visual aids is desirable.
2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20 minutes.

**Note**: Oral test will be conducted by external examiner with the help of internal examiner.

**Course Contents:**

### Unit I

**Listening Skills:** Barriers to listening; effective listening skills; feedback skills

**Activities:** Listening exercises – Listening to conversation, News and TV reports

### Unit II

Attendingtelephone calls; note taking and note making

**Activities:** Taking notes on a speech/lecture

### Unit III

**Speaking and Conversational Skills**: Components of a meaningful and easy conversation;understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics.

**Activities:** 1) Making conversation and taking turns

2) Oral description or explanation of a common object, situation or concept

### Unit IV

The study of sounds of English, stress

Situation based Conversation in English

Essentials of Spoken English

**Activities:** Giving Interviews

**Recommended Books:**

1. *Oxford Guide to Effective Writing and Speaking* by John Seely.

2. *Business Communication* by Sethi, A and Adhikari, B., McGraw Hill Education 2009.

3. *Communication Skills* by Raman, M. & S. Sharma, OUP, New Delhi, India (2011).

4. *A Course in Phonetics and Spoken English* by J. Sethi and P.V. Dhamija, Phi Learning.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2063**

# FUNDAMENTALS OF PLANT BIOCHEMISTRY AND BIOTECHNOLOGY

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** acquire knowledge about basic principles of biochemistry, protein, carbohydrate and fat metabolism.

**CO2:** discuss the basic concepts and techniques of plant tissue culture.

**CO3:** describe various factors governing in vitro culture of plants.

**CO4:** analyze micropropagation technique and its applications.

**CO5:** locate the use of genetic engineering techniques to produce genetic variants in plants for crop improvement.

**CO6:** identify various types of molecular markers and its utility.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2063**

# FUNDAMENTALS OF PLANT BIOCHEMISTRY AND BIOTECHNOLOGY

**(THEORY)**

**Time: 3Hrs** **Max. Marks: 75**

**Theory: 40**

**Practical: 20**

**C.A. :15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

**THEORY:**

## UNIT-I

Importance of Biochemistry.Properties of Water, pH and Buffer. Carbohydrate: Importanceand 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.

## UNIT-II

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

## UNIT-III

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;

## UNIT-IV

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)**

**(Session: 2019-20)**

**Course Code: BACM-2063**

# FUNDAMENTALS OF PLANT BIOCHEMISTRY AND BIOTECHNOLOGY

**(PRACTICAL)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** handle classical and modern plant biotechnology processes.

**CO2:** have a working knowledge of laboratory techniques used in plant biotechnology.

**CO3**: understand the aims and needs of industrial enterprises using plant biotechnology and biochemistry techniques to develop new products.

**CO4:**comprehend new ideas and plan for a biotech startup

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2063**

# FUNDAMENTALS OF PLANT BIOCHEMISTRY AND BIOTECHNOLOGY

**(PRACTICAL)**

**Time: 3Hrs** **Marks: 20**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

## LIST OF EXPERIMENTS

1. Preparation of solution& buffers,
2. Qualitative tests of carbohydrates, amino acids and proteins.
3. Paper chromatography for separation of amino acids/ Monosaccharides.
4. Sterilization techniques.
5. Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium.
6. Callus induction from various explants, micropropagation.

## SUGGESTED READINGS


1. Sarad R.Parekh (ed.). The GMO Handbook, Genetically Modified Animals, Microbes, and Plants in Biotechnology. 374 pages, Humana Press, (2004), ISBN: 1588293076.
2. Razdan M.K. Introduction to Plant Tissue Culture. : 376 pages, Science Publishers Inc 2nd edition (2003), ISBN: 1578082374.
3. Heldt H.W. Plant Biochemistry and Molecular Biology, Oxford University Press. 552 pages, Oxford University Press (1998), ISBN: 0198501803.
4. Buchanan B.B., Gruissem W., Jones L.R. Biochemistry and Molecular Biology of Plants. 1367 pages, American Society of Plant Physiologists, 1 st edition (2000), ISBN: 0943088372.


## REFERENCES


http://www.ochempal.org/index.php/alphabetical/m-n/mutarotation/

https://www.youtube.com/watch?v=JxK5rZxbyQY&t=3s

http://www.aminoacid-studies.com/amino-acids/what-are-amino-acids.html

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2344**

# AGRICULTURAL MICROBIOLOGY

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** describe the morphology, metabolism and genetics of microbes

**CO2:** establish the role of microbes in soil fertility, biofuel production and waste degradation and biological nitrogen fixation.

**CO3:** understand bacterial genetics, genetic recombination-transformation, conjugation and transduction, plasmids, transposon.

**CO4:** understand microbes in human welfare, silage production, biofertilizers, biopesticides, biofuel production and biodegradation of agro-waste.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2344**

# AGRICULTURAL MICROBIOLOGY

**(THEORY)**

**Time: 3Hrs** **Max. Marks: 50**

**Theory: 25**

**Practical: 15**

**C.A. : 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## Unit – I

Introduction. Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, chemoautotrophy, photo autotrophy, growth.

## Unit – II

Bacterial genetics: Genetic recombination-transformation, conjugation and transduction, plasmids, transposon. Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus andSulphur cycles.

## Unit – III

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

## Unit – IV

Microbes in human welfare: silage production, biofertilizers, biopesticides, biofuel production and biodegradation of agro-waste.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2344**

# AGRICULTURAL MICROBIOLOGY

**(PRACTICALS)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** handle different instruments involve in microbiology.

**CO2:** enumerate microbial population in soil and able toisolate different microbes present in soil.

**CO3**: understand different lab techniques involve in microbiology.

**CO4**: develop the idea of exploiting microbes for human welfare as commercial unit.

**B.Sc. (Hons.) Agriculture (Semester –II)**
**(Session: 2019-20)**

**Course Code: BACM-2344**

# AGRICULTURAL MICROBIOLOGY
## (PRACTICALS)

**Time: 3Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

## LIST OF EXPERIMENTS

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

## SUGGESTED READINGS


1. Pelczar Jr MJ, Chan ECS, and Krieg NR. (2004). Microbiology. 5th edition Tata McGraw Hill.
2. Stanier RY, Ingraham JL, Wheelis ML and Painter PR. (2005). General Microbiology. 5th edition McMillan.
3. Dubey, R.C., and Maheshwari, D.K., *A text book of Microbiology*, S. Chand & Company Ltd, New Delhi, 2010.
4. Darralyn M., David S.and Phillip A., *Introduction to microbiology.* Black Well Publication Ltd. USA, 2001.


## REFERENCES


1. http://phytopath.ca/wp-content/uploads/2014/09/Isolation-of-Soil-Microorganisms.pdf ,
2. https://catalog.hardydiagnostics.com/cp_prod/Content/hugo/LactophenolCottonBlStn.htm
3. http://www2.highlands.edu/academics/divisions/scipe/biology/labs/rome/bacterial_smears_and_stains.htm

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2015**

# INTRODUCTORY SOIL AND WATER CONSERVATION ENGINEERING (THEORY)

## COURSE OUTCOMES (CO):

Upon successful completion of this course, students will be able to:

**CO1:** identify soil types and will be able to identify ways to improve soil fertility as well as reduce soil erosion and improve water quality and availability.

**CO2:** understand sustainable practices for production of food, feed and fiber crop and how to implement and evaluate them.

**CO3:** apply their knowledge to solve problems related to growth, crop production

**CO4:** apply their knowledge to solve problems related to water management following conservative but sustainable techniques.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2015**

# INTRODUCTORY SOIL AND WATER CONSERVATION ENGINEERING (THEORY)

**Time: 3Hrs**

**Max. Marks: 50**
**Theory: 25**
**Practical: 15**
**C.A.: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

**Theory:**

**UNIT-I:**

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

**UNIT-II:**

5) Gully classification
6) Gully control measures

**UNIT-III:**

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

**UNIT-IV:**

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

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2015**

# INTRODUCTORY SOIL AND WATER CONSERVATION ENGINEERING (PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** understand general status of soil conservation in India.

**CO2:** enumerate microbial population in soil and able toisolate different microbes present in soil.

**CO3**: understand different lab techniques involve in microbiology.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2015**

# INTRODUCTORY SOIL AND WATER CONSERVATION ENGINEERING (PRACTICAL)

**Time: 3Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya,Jalandhar.

## LIST OF EXPERIMENTS

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

## SUGGESTED READINGS


1. Fangmeier, W., Elliott, W.J., Workman, S., Huffman, R. and Schwab, G.O. 2005. Soil and Water Conservation Engineering, 5th Edition, Cengage Learning, Inc., Clifton Park, USA.
2. Frevert, R.K., Schwab, G.O. Edminster, T.W. and Barnes, K.K. 2009. Soil and Water Conservation Engineering, 4th Edition, John Wiley and Sons, New York.
3. Michael, A.M. and Ojha, T.P. 2003. Principles of Agricultural Engineering. Volume II. 4th Edition, Jain Brothers, New Delhi.
4. Murthy, V.V.N. 2002. Land and Water Management Engineering. 4th Edition, Kalyani Publishers, New Delhi.


## REFERENCES


1.https://www.qld.gov.au/dsiti/assets/soil/gully-erosion.pdf
2.https://www.qld.gov.au/dsiti/assets/soil/wind-erosion.pdf
3.http://megapib.nic.in/soil_conservation_control.htm

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2016**

# FUNDAMENTALS OF CROP PHYSIOLOGY

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** understand the concept of crop physiology and its importance in relation to agriculture.

**CO2:** acquire information about plant nutrient classification, respiration vernalization and photoperiodism.

**CO3:** understand how the environment influence plant growth and crop yield and ways to modify the environment to improve plant growth and yields.

**CO4:** understand mechanism of respiration and photosynthesis.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2016**

# FUNDAMENTALS OF CROP PHYSIOLOGY

**(THEORY)**

**Max. Marks: 75**

**Time: 3Hrs**

**Theory: 40**

**Practical: 20**

**C.A. : 15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## Unit – I

Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview;

Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology;

## Unit – II

Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms; Photosynthesis: Light and Dark reactions, C3, C4 and CAM plants;

## Unit – III

Respiration: Glycolysis, TCA cycle and electron transport chain; Fat Metabolism: Fatty acid synthesis and Breakdown; Plant growth regulators: Physiological roles and agricultural uses

## Unit – IV

Physiological aspects of growth and development of major crops: Growth analysis, Role of Physiological growth parameters in crop productivity.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2016**

# FUNDAMENTALS OF CROP PHYSIOLOGY

**(PRACTICALS)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:**understand different phenomenon associated with plant physiology

**CO2:** handle different instruments involved in plant physiology.

**CO3:** develop understanding of various developmental stages of crop growth and factors affecting crop growth.

**CO4:** learn about natural as well as artificial regulators of plant growth.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2016**

# FUNDAMENTALS OF CROP PHYSIOLOGY

**(PRACTICALS)**

**Time:3Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office Kanya Maha Vidyalaya,Jalandhar.

## LIST OF EXPERIMENTS

1 Study of plant cells, structure and distribution of stomata.
2 Study of imbibitions, osmosis, plasmolysis.
3 Measurement of root pressure, rate of transpiration.
4 Separation of photosynthetic pigments through paper chromatography.
5 Rate of transpiration, photosynthesis, respiration.
6 Tissue test for mineral nutrients.
7 Estimation of relative water content.
8 Measurement of photosynthetic CO2 assimilation by Infra Red Gas Analyser (IRGA).

## SUGGESTED READINGS


1. Devlin, R.M., Plant Physiology, Prindle Weber & Svhmidt Publisher, New York, 1983.
2. Kochhar, P.L., Plant Physiology, Trumen Publishers Jalandhar, 2010.
3. Bhatia K.N., and Widge, R., Foundation of Botany , Truman Publishers, Jalandhar, 2010.


## REFERENCES


1.http://www.cropnutrition.com/nutrient-knowledge
2.www.biologydiscussion.com/plants/
3.http://www.biologyreference.com/Ta-Va/Translocation.html

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2177**

# FUNDAMENTALS OF AGRICULTURAL ECONOMICS

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** investigate, critique and evaluate the cost benefits in relation to agriculture system.

**CO2:** collaborate; identify multiple perspectives of cost in agriculture.

**CO3:** demonstrate, implement, create and apply the economic laws in Agriculture.

**CO4:** conceptualize in a holistic manner the ways to plug loopholes for more benefits to the farmer

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2177**

# FUNDAMENTALS OF AGRICULTURAL ECONOMICS

**Max.Marks: 50**

**Theory: 40**

**Time: 3Hrs** **C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## UNIT-I

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 anddevelopment in the country.*Demand:* meaning, law of demand, schedule and demand curve, determinants, utility theory; law of diminishing marginal utility, equi-marginal utility principle.

## UNIT-II

Consumer's equilibrium and derivation of demand curve, concept of consumer surplus. Elasticityof demand: concept and measurement of price elasticity, income elasticity and cross elasticity.Production: input output relationship. *Laws ofreturns*: Law of variable proportions and law of returns to scale. *Cost:* concepts, short run andlong run cost curves. Supply: Stock v/s supply, law of supply, schedule, supply curve, determinantsof supply, elasticity of supply.

## UNIT-III

Market structure: meaning and types of market, basic features ofperfectly competitive and imperfect markets. Price determination under perfect competition;short run and long run equilibrium of firm and industry, *National income:* Meaning concepts of national income approaches to measurement, difficulties in measurement.Population: Malthusian theory.

## UNIT-IV

Money: Bartersystem of exchange and its problems, meaning and functions of money, classificationof money, Agriculturaland public finance: micro v/s macro finance, need for agricultural finance, publicrevenue and public expenditure. *Tax:* meaning, direct and indirect taxes, agricultural taxation, socialistic and mixed economies, Elements of economic planning.

## SUGGESTED READINGS

1. Lekhi, R.K. and Singh, J., Agricultural Economics-, Kalyani publishers, Ludhiana, 2007.
2. Black. J.D., *Introduction of Economics for Agriculture*, Fromount Pierre National Press, 1955.
3. Nanavati, M.B. and J. J. Anjaria, *The Indian Rural Problem*. The Indian Society of Agricultural Economics, Bombay,1944.
4. Memoria, C.B. and B.B. , *Agricultural Problems in India*, Kitab Mahal, Allahabad, 2007

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2018**

# FUNDAMENTALS OF GENETICS

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:**understand core genetic concepts including cell biology and evolution.

**CO2:** understand molecular biology concepts with relevance to plant breeding.

**CO3:** understand chromosomal architecture, theory of inheritance, cell cycle and cell division

**CO4:** explain key concepts of genome organization and manipulation.

**B.Sc. (Hons.) Agriculture (Semester –II)**
**(Session: 2019-20)**

**Course Code: BACM-2018**

# FUNDAMENTALS OF GENETICS
# (THEORY)

**Max. Marks: 75**
**Time: 3 Hrs.** **Theory: 40**
**Practical: 20**
**C.A. : 15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

**THEORY:**

## Unit – I

Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity. Architecture of chromosome; chromonemata, chromosome matrix, chromomeres, centromere, secondary constriction and telomere; special types of chromosomes.

## Unit – II

Chromosomal theory of inheritance- cell cycle and cell division - mitosis and meiosis. Probability and Chi-square. Dominance relationships, Epistatic interactions with example. 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.

## Unit – III

Structural and numerical variations in chromosome and their implications, Use of haploids, dihaploids and doubled haploids in Genetics.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.

## Unit – IV

Genetic disorders.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.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2018**

# FUNDAMENTALS OF GENETICS

**(PRACTICAL)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1**: understand and observe the process of cell division

**CO2**: understand scientific process of hybridization.

**CO3:** understand inheritance of characters and hybridization

**CO4:** to sharpen their critical abilities to take up crop improvement through selection and hybridization

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2018**

# FUNDAMENTALS OF GENETICS
## (PRACTICAL)

**Time: 3Hrs** **Marks: 20**

**Instructions for Practical Examiner: Question** paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

## LIST OF EXPERIMENTS

1. Study of microscope.
2. Study of cell structure.
3. Preparation of micro slides and identification of various stage of cell division.
4. Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross.
5. Experiments on epistatic interactions including test cross and back cross.
6. Practice on mitotic and meiotic cell division.
7. Continuation of Exercise 6
8. Experiments on probability and Chi-square test.
9. Determination of linkage and cross-over analysis (through two point test cross and three point test cross data).
10. Study on sex linked inheritance in Drosophila.
11. Demonstration of structural aberrations and polyploidy.
12. Study of models on DNA and RNA structures.

## SUGGESTED READINGS


1. Strickberger, M.W.2001.Genetics. Prentice Hall of India. Pvt. Ltd., New Delhi.
2. Singh, B.D., Fundamentals of Genetics,Kalyani Publishers, Ludhiana, 2006.
3. Gardner, E.J., Principles of Genetics, John Wiley and Sons, New York, 1991.
4. Phundan Singh. Elements of genetics. Kalyani, 2016
5. Singh, P., Genetics, Kalyani Publishers Ludhiana, 2000.


## REFERENCE


1. www.nmsu.edu
2. www.biology200.gsu.edu

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2019**

# FUNDAMENTALS OF ENTOMOLOGY

**(THEORY)**

## COURSE OUTCOMES (CO):

Upon successful completion of this course, students will be able to:

**CO1:** distinguish the main classes of organisms in relation to arthropods and illustrate their functional importance.

**CO2**: develop a holistic knowledge about insect morphology and anatomy.

**CO3**: students will understand how to identify and sustainably manage insects in various plant production systems.

**CO4** understand principles of Integrated Pest Control

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2019**

# FUNDAMENTALS OF ENTOMOLOGY

**(THEORY)**

**Time: 3Hrs** **Max. Marks: 100**

**Theory: 60**

**Practical: 20**

**C.A. : 20**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## Unit – I

History of Entomology in India. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes.Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting. Body segmentation.Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, Wing venation, 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, secretary (Endocrine) and reproductive system, in insects.Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptor.

## Unit – II

Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors– temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents. Effect of biotic factors – food competition, natural and environmental resistance.

Categories of pests.Concept of IPM, Practices, scope and limitations of IPM. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Chemical controlimportance, hazards and limitations. Recent methods of pest control, repellents, anti feed ants, hormones, attractants, gamma radiation. Insecticides Act 1968- Important provisions. Application techniques of spray fluids.Symptoms of poisoning, first aid and antidotes.

## Unit – III

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, basic groups of present day insects with special emphasis to orders and families of Agricultural importance like Orthoptera: Acrididae, Tettigonidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera:Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae,

## Unit – IV

Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthridinidae, Apidae. Trichogrammatidae, lchneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae,Muscidae, Tephritidae.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2019**

# FUNDAMENTALS OF ENTOMOLOGY

**(PRACTICALS)**

## Course Outcomes:

Upon successful completion of this course, students will be able to:

**CO1:** identify different types of insects present in locality.

**CO2**: identify different body parts of insects.

**CO3**: understand major differentiating characters and taxonomic classification.

**CO4**: understand the application of Insecticides and Pesticide.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2019**
**Credit Hrs: 4(3+1)**

# FUNDAMENTALS OF ENTOMOLOGY
## (PRACTICALS)

**Time: 3Hrs** **Marks: 20**

**Instructions for Practical Examiner: Question** paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

## LIST OF EXPERIMENTS

1. Methods of collection and preservation of insects including immature stages.
2. External features of Grasshopper/Blister beetle;.
3. Types of insect antennae, mouthparts and legs;
4. Wing venation, types of wings and wing coupling apparatus.
5. Types of insect larvae and pupae.
6. Dissection of digestive system in insects (Grasshopper).
7. Dissection of male and female reproductive systems in insects (Grasshopper).
8. Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera,
9. Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance.
10. Insecticides and their formulations.
11. Pesticide appliances and their maintenance.
12. Sampling techniques for estimation of insect population and damage.

## SUGGESTED READINGS

1. Mani, M.S., General Entomology, Oxford & I.B.H. Pub. New Delhi, 1973.
2. David, B.V. and Ananthakrishnan, T.N., General and applied Entomology Second Edition,Tata Mcgraw Hill,New Delhi, 2006.
3. Atwal, A.S. and Dhariwal G.S., Agricultural pests of India and South-East Asia, Kalyani Publishers, Ludhiana,2007.
4. Srivastva, K.P., Text book of Applied Entomology. Kalyani Publishers.Ludhiana, 2009.
5. Gour, T.B and Sriramulu, M. Insect physiology principles and concepts. Kalyani, 2017

## REFERENCES

www.entomology.ifas.ufl.edu/capinera/eny5236/pest1/content/04/4_handout.pdf
www.ucmp.berkeley.edu/arthropoda/arthropoda.html
coursesonline.iasri.res.in/mod/page/view.php?id=101147

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2010**

# FUNDAMENTALS OF AGRICULTURAL EXTENSION EDUCATION

**(THEORY)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** comprehend the concept and principles of effective extension and identify the organizational set up of agricultural extension.

**CO2:** understand the concept of adoption/diffusion of innovations, motivation, planning and evaluation.

**CO3:** understand evaluation of extension programmes, transfer of technology, capacity building of extension personnel, and extension teaching methods.

**CO4**: understand ICT Applications in TOT (New and Social Media), media mix strategies and communication.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2010**

**FUNDAMENTALS OF**

# AGRICULTURAL EXTENSION EDUCATION

**(THEORY)**

**Time: 3Hrs**

**Max. Marks: 75**
**Theory: 40**
**Practical: 20**
**C.A. : 15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## Unit – I

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.

## Unit – II

Extension systems in India: 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: privatization extension, cyber extension/ e-extension, market-led extension, farmer-led extension, expert systems, etc.

## Unit – III

Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Dev.-meaning, definition, concept & principles,Philosophy of C.D. Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions.

## Unit – IV

Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: concept and models, capacity building of extension personnel; extension teaching methods: meaning, classification, individual, group and mass contact methods, ICT Applications in TOT (New and Social Media), media mix strategies; communication: meaning and definition; 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.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2010**

# FUNDAMENTALS OF AGRICULTURAL EXTENSION EDUCATION

**(PRACTICALS)**

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

**CO1:** understand evaluation of extension programmes, transfer of technology, capacity building of extension personnel and extension teaching methods.

**CO2**: understand ICT Applications in TOT (New and Social Media), media mix strategies and communication.

**CO3**: understand and communicate social issues.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: BACM-2010**

# FUNDAMENTALS OF AGRICULTURAL EXTENSION EDUCATION

**(PRACTICALS)**

**Instructions for Practical Examiner: Question** paper is to be set on the spot jointly by the Internal and External Examiners.Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

**LIST OF EXPERIMENTS**

1 To get acquainted with university extension system.
2 Group discussion- exercise.
3 Handling and use of audio visual equipment's and digital camera and LCD projector.
4 Preparation and use of AV aids.
5 Preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories
6 Presentation skills exercise; micro teaching exercise.
7 A visit to village to understand the problems being encountered by the villagers/ farmers.
8 To study organization and functioning of DRDA and other development departments at district level.
9 A visit to NGO and learning from their experience in rural development.
10 Understanding PRA techniques and their application in village development planning.
11 Exposure to mass media.
12 Visit to community radio and television studio for understanding the process of programme production.
13 Script writing, writing for print and electronic media, developing script for radio and television.

**SUGGESTED READINGS**


1. Mondal, S. and Ray G.L., *A Text book of Rural Development*.Kalyani Publishers, Chennai, 2007.
2. Dharma, O.P. and Bhatnagar, O.P., *Education and Commnication for Development.*Oxford, IBH, New Delhi, 2003.
3. Desai, A.R., *Rural Sociology in India*. Popular Prakashan, Bombay, 2003.
4. Ray G.L., *Extension Communication and Management*, Kalyani Publishers, Chennai, 2007.


**REFERENCES**


1. http://eagri.tnau.ac.in/eagri50/AEXT392/lec3.html
2. http://www.agri.kkwagh.edu.in/Theory%20N/EXTN353.
3. http://www.manage.gov.in/publications/edigest/1999-1.pdf

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: AECD-2161**

# DRUG ABUSE: PROBLEM MANAGEMENT AND PREVENTION

## COURSE OUTCOMES (CO):

After passing this course the student will be able to:

CO1. This information can include factual data about what substance abuse is; warning signs of addiction; information about how alcohol and specific drugs affect the mind and body;

CO2. How to be supportive during the detoxification and rehabilitation process.

CO3. Main focus of substance abuse education is teaching individuals about drug and alcohol abuse and how to avoid, stop, or get help for substance use disorders.

CO4.Substance abuse education is important for students alike; there are many misconceptions about commonly used legal and illegal substances, such as alcohol and marijuana.

**B.Sc. (Hons.) Agriculture (Semester –II)**

**(Session: 2019-20)**

**Course Code: AECD-2161**

# DRUG ABUSE: PROBLEM MANAGEMENT AND PREVENTION

**Time: 3 Hrs** **Max.Marks: 50**

**Theory: 40**

**CA: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

## UNIT I

**1) Consequences of Drug Abuse for:**

1) Individual – Education, employment and income issues.
2) Family – Violence
3) Society – Crime.
4) Nation – Law and order problem.

## UNIT II

**2) Management of Drug abuse:**

1) Medical Management: Medication for treatment and to reduce withdrawal effects, Drug De-addiction clinics, Relapse management.
2) Psycho-Social Management: Counselling, family and group therapy, behavioural and cognitive therapy, Environmental Intervention.

## UNIT III

**3) Prevention of Drug Abuse:**

1) Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.
2) School
Counselling, Teacher as role-model. Parent-Teacher-Health Professional Coordination, Random testing on students.

## UNIT IV

**4) Awareness of drug abuse**

1) Media:
Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program.

2) legislation:

NDPs act, statuory warnings, policing of borders, checking supply/ smuggling of drugs, strict enforcement of laws, time bound trial.

**References:**

1.Ahuja, Ram (2003), *Social Problems in India*, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3.Modi, Ishwar and Modi, Shalini (1997) *Drugs: Addiction and Prevention*, Jaipur: Rawat Publication.
6. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
7. Sain, Bhim 1991, *Drug Addiction Alcoholism*, Smoking obscenity New Delhi: Mittal Publications.
8. Sandhu, Ranvinder Singh, 2009, *Drug Addiction in Punjab*: A Sociological Study. Amritsar: Guru Nanak Dev University.
9. Singh, Chandra Paul 2000. *Alcohol and Dependence among Industrial Workers*: Delhi: Shipra.

# Kanya Maha Vidyalya, Jalandhar (Autonomous)

**CURRICULUM AND SCHEME OF EXAMINATIONS OF FOUR YEAR DEGREE PROGRAMME**

**B.Sc. (Hons.) Agriculture**

| Course code | Course Name | Course Type | Marks | | | | Periods/Week | | Examination time (in hours) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | Mode of Assessment | | | L | P | |
| | | | | External | | Internal | | | |
| | | | | L | P | CA | | | |
| BACM-3011 | Crop Production Technology-I (Kharif Crops) | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-3012 | Fundamentals of Plant Breeding | C | 75 | 40 | 20 | 15 | 3 | 3 | 3+3 |
| BACM-3013 | Introductory Agro-meteorology & Climate Change | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-3014 | Production Technology For Vegetables & Spices | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-3015 | Principles of Seed Technology | C | 75 | 20 | 40 | 15 | 2 | 6 | 3+3 |
| BACL-3016 | Problematic Soils & their Management | C | 50 | 40 | 0 | 10 | 3 | - | 3+0 |
| BACM-3177 | Agricultural Finance & Co-operation | C | 75 | 40 | 20 | 15 | 2 | 3 | 3+3 |
| BACM-3138 | Statistical Methods | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| AECE-3221 | Environmental Studies and Disaster Management | C | 75 | 40 | 20 | 15 | 3 | 3 | 3+3 |
| **Grand Total** | | | **550** | | | | | | |

**Session – 2019-20**

**C – Compulsory**

**E – Elective**

**AC-Audit Course**

*** Marks of these papers will not be added in total marks and only grades will be provided.**

## B.Sc. (Hons.) Agriculture (Session: 2019-20)

| Course code | Course Name | Course Type | Marks | | | | Periods/Week | | Examination time (in hours) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | Mode of Assessment | | | L | P | |
| | | | | External | | Internal | | | |
| | | | | L | P | CA | | | |
| BACM-4011 | Crop Production Technology-II (Rabi Crops) | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-4012 | Production Technology for Ornamental crops, MAP & Landscaping | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-4013 | Renewable Energy & Green Technology | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-4014 | Production Technology For Fruits & Plantation Crops | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-4015 | Farm Machinery & Power | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACL-4016 | Farming System & Sustainable Agriculture | C | 25 | 20 | 0 | 5 | 2 | - | 3 |
| BACM-4017 | Livestock & Poultry Management | C | 100 | 60 | 20 | 20 | 4 | 3 | 3+3 |
| BACM-4128 | Agri Informatics | C | 50 | 25 | 15 | 10 | 2 | 3 | 3+3 |
| BACM-4099 | Agricultural Marketting, Trade & Prices | C | 75 | 40 | 20 | 15 | 3 | 3 | 3+3 |
| | Elective Courses | | | | | | | | |
| BACM-4010 (OPT-I) | Biopesticides & Biofertilizers/ | E | 75 | 40 | 20 | 15 | 3 | 3 | 3+3 |
| BACM-4010 (OPT-II) | Landscaping | E | 75 | 40 | 20 | 15 | 3 | 3 | 3+3 |
| **Grand Total** | | | **575** | | | | | | |

**E – Elective**
**C – Compulsory**
**E – Elective**
**AC-Audit Course**
*** Marks of these papers will not be added in total marks and only grades will be provided.**

# B.Sc. (Hons.) Agriculture
# (Session: 2019-20)

## ProgrammeSpecificOutcomes(PSO)–

Upon successful completion of this course, students will be able to:

**PSO1.** acquire, integrate, and apply the plant-science knowledge in a holistic manner needed for agriculturists.

**PSO2**. develop interdisciplinary knowledge and have the ability to actually perform physical tasks that require practice and training .

**PSO3**. develop creative skills to solve problems and improve current systems and can intervene to make improvements or correct deficiencies.

**PSO4**.developed leadership skills and exhibit a high level of professionalism andeffective communication.

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: BACM-3011**

# CROP PRODUCTION TECHNOLOGY-I (*KHARIF CROPS*)

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about basic principles of crop production practices of kharif crops.

**CO2:** Understand about cultural operations for raising kharif crops.

**CO3:** Precisely understand about qualitative and quantitative input requirements for *Kharif* crop production.

**CO4:** Learn about various management practices for commercial crop production.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3011**

# CROP PRODUCTION TECHNOLOGY-I (*KHARIF CROPS*)

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 25**

**Practical: 15**

**C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of kharif crops. Cereals – rice, maize, sorghum, pearl millet and finger millet.

### Unit – II

Cultural practices and yield of kharif crops – pulses – pigeonpea, mungbean and urdbean.

### Unit – III

Cultural practices and yield of kharif crops – oilseeds – groundnut and soybean; fibre crops – cotton & jute.

### Unit – IV

Cultural practices and yield of kharif crops – forage crops – sorghum, cowpea, cluster bean and napier bajra.

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: BACM-3011**

# CROP PRODUCTION TECHNOLOGY-I (*KHARIF CROPS*)

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Raise nursery of rice crop and do transplanting.

**CO2:** Learnabout sowing, nutrient requirements of various kharif crops.

**CO3:** Realize the effect of seed size and sowing depth on germination of seeds and develop the idea of yield contributing factors and its calculation. .

**CO4:** Identify various problematic weeds of kharif crops and their management.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3011**

# CROP PRODUCTION TECHNOLOGY-I (*KHARIF CROPS*)

(PRACTICALS)

**Time: 3 Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1 Rice nursery preparation.
2 Transplanting of rice.
3 Sowing of soybean, pigeonpea & mungbean. Maize, groundnut & cotton.
4 Effect of seed size on germination and seedling vigour of kharif season crops.
5 Effect of sowing depth on germination of kharif crops.
6 Identification of weeds in kharif season crops.
7 Top dressing & foliar feeding of nutrients.
8 Study of yield contributing characters and yield calculation of kharif season.
9 Study of crop varieties and important agronomic experiments at experimental farm.
10 Study of forage experiments, morphological description of kharif season crop.
11 Visit to research centres of related crops.

**SUGGESTED READINGS**


1. Anonymous (2018) Package of practices for cultivation of Kharif Crops, Punjab Agricultural University, Ludhiana.
2. Indian Council of Agricultural Research (2017). Handbook of Agriculture, ICAR, New Delhi.
3. Jeyaraman S (2018). Field crops production and management Vol. 1. CBS.
4. Panda S.C. (2018). Agronomy of fodder & forage crop, Kalyani Publishers, New Delhi.
5. Reddy, S.R. Agronomy of Field Crops, Kalyani Publishers, Ludhiana.
6. Reddy S R (2016). Introduction to agronomy and principles of crop production. Kalyani Publishers, New Delhi.
7. Singh S S and Singh R (2018). Crop management. Kalyani Publishers, New Delhi.

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: BACM-3012**

# FUNDAMENTALS OF PLANT BREEDING

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Understand about the genetic basis and methods of breeding of self-pollinated & cross pollinated crops

**CO2:** Understand the concept of polyploidy, mutation, DNA markers and marker assisted selection in plant breeding,

**CO3:** Learn the application of plant breeding techniques for crop improvement.

**CO4:** Learn about IPR, patenting, Plant Breeders & Farmer's Rights.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3012**

# FUNDAMENTALS OF PLANT BREEDING

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 75**

**Theory: 40**

**Practical: 20**

**C.A: 15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

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

### Unit – II

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.

### Unit – III

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.

### Unit – IV

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

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: BACM-3012**

# FUNDAMENTALS OF PLANT BREEDING

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Understand floral morphology of self and cross pollinated crops and germplasm variations.

**CO2:** Learn emasculation & hybridization techniques in self & cross pollinated crops

**CO3:** Study different breeding methods for crop improvement and procedures for evaluating performance of crops

**CO4:** Utilize statistical methods, various designs used in plant breeding.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3012**

# FUNDAMENTALS OF PLANT BREEDING

(PRACTICALS)

**Time: 3 Hrs** **Marks: 20**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

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

**SUGGESTED READINGS**


1. Allard, Robert W (2018). Principles of plant breeding. John Wiley & Sons.
2. Singh B.D. (2017). Plant breeding: principles and methods. Kalyani Publishers, New Delhi.
3. Phundan Singh (2018). Essentials of plant breeding. Kalyani Publishers, New Delhi.
4. Phundan Singh (2017). Plant Breeding: Molecular and new approaches. Kalyani Publishers, New Delhi.
5. Bahl P. N, Salimath P. M (1997). Genetics, cytogenetics and breeding of crop plant Vol. II. Oxford & IBH.
6. Ram, Hari Har (2016). Crop breeding and biotechnology. Kalyani Publishers, New Delhi.
7. Sharma A.K and Sharma Ramavt (2014). Crop improvement and mutation breeding. Scientific Publishers.

**B.Sc. (Hons.) Agriculture (Semester-III)**

**(Session: 2019-20)**

**Course Code: BACM-3013**

# INTRODUCTORY AGROMETEOROLOGY & CLIMATE CHANGE

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Have understanding about earth's atmosphere, climate and weather parameters.

**CO2:** Learn about precipitation, monsoon status of India and concept of artificial rainmaking.

**CO3:** Learn about the significance of weather and weather hazards in crop production.

**CO4:** Understand the process of weather forecasting, climate change and its widespread impact on agriculture.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3013**

# INTRODUCTORY AGROMETEOROLOGY & CLIMATE CHANGE

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 25**

**Practical: 15**

**C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

**Unit – I**

Meaning and scope of agricultural meteorology, 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.

**Unit – II**

Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, longwave and thermal radiation, net radiation, albedo, 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.

**Unit – III**

Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, 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.

**Unit – IV**

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-III)**
**(Session: 2019-20)**

**Course Code: BACM-3013**

# INTRODUCTORY AGROMETEOROLOGY & CLIMATE CHANGE

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** develop understanding about various meteorological instruments and their working.

**CO2:** Acquire skills in measuring radiation, air and soil temperature, atmospheric pressure, wind speed and direction.

**CO3:** Learn about determination of vapor pressure and relative humidity, dew point temperature.

**CO4:** understand about evapotranspiration, soil water balance and rainfall variation and heat units and measuring precipitation

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3013**

# INTRODUCTORY AGROMETEOROLOGY & CLIMATE CHANGE

(PRACTICALS)

**Time: 3 Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

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

## References:


1. Lenka D (2015). Climate, weather and crops in India. Kalyani Publishers, New Delhi.
2. Mavi, H.S. (2016). Introduction to agrometerology. Oxford & IBH Publishing.
3. Gouindan K (2016). Agricultural meteorology and dry farming. Kalyani Publishers, New Delhi.
4. Mahi G.S. and Kingra P.K. (2016). Fundamentals of Agrometeorology. Kalyani Publishers, New Delhi.
5. Sahu, D.D, Chopra, M.C and Kac. (2015). Practical agrometeorology. Agrobios

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: BACM-3014**

# PRODUCTION TECHNOLOGY FOR VEGETABLES AND SPICES

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Understand importance of vegetables & spices in human nutrition and national economy.

**CO2:** Learn about origin, area, production, cultural practices and seed production of important vegetable groups.

**CO3:** Learn about origin, area, production, cultural practices and seed production of important spices.

**CO4:** Learn about harvesting technique and post-harvest handling and economics of commercial vegetable and spice cultivation.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3014**

# PRODUCTION TECHNOLOGY FOR VEGETABLES AND SPICES

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 25**

**Practical: 15**

**C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

Importance of vegetables & spices in human nutrition and national economy, kitchen Gardening,brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of and seed production of tomato, brinjal, chilli, capsicum.

### Unit – II

Origin, area, climate, soil, improved varieties and cultivation practices and seed production of root crops viz. carrot, radish, beetroot etc, bulb crops viz. onion, garlic etc and cole crops viz. cabbage, cauliflower, knol-khol etc.

### Unit – III

Origin, area, production, improved varieties and cultivation practices and seed production of cucurbitaceous crops viz. cucumber, melons, gourds, pumpkin etc, leafy crops viz. amaranth, palak, perennial vegetables etc and leguminous crops viz. peas, french bean and tuber crops viz. potato, sweet potato, colocasia etc.

### Unit – IV

Origin, area, production, improved varieties and cultivation practices and seed production of important spices.

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: BACM-3014**

# PRODUCTION TECHNOLOGY FOR VEGETABLES AND SPICES

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Identify various vegetable crops & their seeds.

**CO2:** Learn about nursery raising & transplanting techniques.

**CO3:** Plan and lay out vegetable garden and production practices

**CO4:** Learn about harvesting technique and post-harvest handling and economics of commercial vegetable and spice cultivation.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3014**

# PRODUCTION TECHNOLOGY FOR VEGETABLES AND SPICES

(PRACTICALS)

**Time: 3 Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1 Identification of vegetables & spice crops and their seeds.
2 Nursery raising of vegetable crops.
3 Direct seed sowing and transplanting.
4 Study of morphological characters of different vegetables & spices.
5 Fertilizers applications.
6 Offseason production of nursery
7 Vegetables & spices seed extraction.
8 Harvesting & preparation for market.
9 Economics of vegetables and spices cultivation.

**SUGGESTED READINGS**


1 Anonymous (2018). Package of practices for cultivation of vegetable crops. Punjab Agricultural University, Ludhiana.
2 Dhaliwal, Major Singh (2017). Handbook of vegetable crops. Kalyani Publishers, New Delhi.
3 Gopalakrishnan, T.R. (2007). Vegetable crops. New India Publishing Agency.
4 Hazra P and Som M. G. (2016). Vegetable seed production and hybrid technology. Kalyani Publishers, New Delhi.
5 Prasad S and Bhardwaj Raju L. (2016). Production technology of spices, aromatic, medicinal and plantation crops. Agrobios (India), Jodhpur.
6 Rana, M.K. (2015). Technology for Vegetable Production. Kalyani Publishers, New Delhi.
7 Thamburaj, S and Narendra Singh (2016). Vegetables, tuber crops and spices. ICAR, New Delhi.

**B.Sc. (Hons.) Agriculture (Semester-III)**

**(Session: 2019-20)**

**Course Code: BACM-3015**

# PRINCIPLES OF SEED TECHNOLOGY

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about maintenance of genetic purity and quality seed production.

**CO2:** Have sound knowledge of different breeding tools used in seed production

**CO3:** Learn about different seed testing methods, the process of seed certification and seed act.

**CO5:** Learn about seed processing, packing, storage, pest control and marketing.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3015**

# PRINCIPLES OF SEED TECHNOLOGY

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 75**

**Theory: 20**

**Practical: 40**

**C.A: 15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

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.

### Unit – II

Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables. 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.

### Unit – III

Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops and organic seed production.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.

### Unit – IV

Measures for pest and disease control during storage. 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.

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: BACM-3015**

# PRINCIPLES OF SEED TECHNOLOGY

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn seed production in major cereals, pulses, oilseeds and vegetable crops.

**CO2:** Experience seed sampling and testing technique.

**CO3:** Acquire information about seed certification process.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3015**

# PRINCIPLES OF SEED TECHNOLOGY

(PRACTICALS)

**Time: 3 Hrs** **Marks: 40**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1 Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi.
2 Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea.
3 Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard.
4 Seed production in important vegetable crops.
5 Seed sampling and testing: Physical purity, germination, viability, etc.
6 Seed and seedling vigour test.
7 Genetic purity test: Grow out test.
8 Seed certification: Procedure, Field inspection, Preparation of field inspection report.
9 Trizolium chloride test for seed viability.
10 Modification of storage environment for temperature and relative humidity.

**SUGGESTED READINGS**


1. Agarwal, R.L.1995. Seed Technology. Oxford and IBH Publication Co., New Delhi.
2. Dhrendra Khare and Mohan S. Bhale. 2007. Seed Technology. Scientific Publishers (India), Joghpur.
3. Phundan Singh (2016). Objective seed technology. Kalyani Publishers, New Delhi.
4. Phundan Singh (2017). Principles of seed technology. Kalyani Publishers, New Delhi.

**B.Sc. (Hons.) Agriculture (Semester-III)**

**(Session: 2019-20)**

**Course Code: BACL-3016**

# PROBLEMATIC SOILS AND THEIR MANAGEMENT

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about the soil quality, health, wasteland and problematic soils in India.

**CO2:** Learnabout reclamation procedures of problematic soils and bioremediation.

**CO3:** Have knowledge about quality & standards of irrigation water and utilization of saline water in Agriculture.

**CO4:** Understand the importance of Remote Sensing & GIS in diagnosing and managing problem soils.

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**(Session: 2019-20)**

**Course Code: BACL-3016**

# PROBLEMATIC SOILS AND THEIR MANAGEMENT

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 40**

**C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

**Unit – I**

Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties.

**Unit – II**

Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils.

**Unit – III**

Irrigation water – quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils.

**Unit – IV**

Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soils under different Agro-ecosystems.

**SUGGESTED READINGS**


1. Indian Society of Soil Science (2012). Fundamentals of Soil Science. IARI, New Delhi.
2. Das, D.K. (2015). Introductory Soil Science, 4th edition, Kalyani Publishers, New Delhi.
3. Bhattacharya, Lata (2018). Textbook of soil chemistry. Discovery.
4. Saha, Arun Kumar (2014). Methods of physical and chemical analysis of soil. Kalyani Publishers, New Delhi.
5. Brady Nyle C and Weil Ray R. (2017). Nature and properties of soils. Pearson Publications.

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: BACM-3177**

# AGRICULTURAL FINANCE AND CO-OPERATION

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Understand the concept of Agricultural Finance& Agricultural credit.

**CO2:** Have knowledge about various sources of agricultural finance and micro-financing.

**CO3:** Learn about various finance institutions like NABARD, RBI, ADB, IMF, World Bank etc

**CO4:** Describe the concept of Agricultural Co-operation in India.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3177**

# AGRICULTURAL FINANCE AND CO-OPERATION

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 75**

**Theory: 40**

**Practical: 20**

**C.A: 15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

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.

### Unit – II

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.

### Unit – III

An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, world bank. Insurance and Credit Guarantee Corporation of India. Cost of credit. Recent development in agricultural credit. Preparation and analysis of financial statements – Balance Sheet and Income Statement. Basic guidelines for preparation of project reports.

### Unit – IV

Agricultural Cooperation – Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture. Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives, farmers service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing; role of ICA, NCUI, NCDC, NAFED.

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: BACM-3177**

# AGRICULTURAL FINANCE AND CO-OPERATION

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Analyse the progress and performance of co-operatives from published data.

**CO2:** Acquire knowledge about management, schemes and procedures of commercial banks, co-operative banks and societies.

**CO3:** Estimate the credit requirement of farm business, analyze balance sheet and income statement.

**CO4:** Understand techno-economic parameters for preparation of projects and appraisal procedures of loan proposal.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3177**

# AGRICULTURAL FINANCE AND CO-OPERATION

(PRACTICALS)

**Time: 3 Hrs** **Marks: 20**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1 Determination of most profitable level of capital use.
2 Optimum allocation of limited amount of capital among different enterprise.
3 Analysis of progress and performance of cooperatives using published data.
4 Analysis of progress and performance of commercial banks and RRBs using published data.
5 Estimation of credit requirement of farm business – A case study.
6 Preparation and analysis of balance sheet – A case study.
7 Preparation and analysis of income statement – A case study.
8 Appraisal of a loan proposal – A case study.
9 Visit to a commercial bank, cooperative bank and cooperative society to acquire firsthand knowledge of their management, schemes and procedures.

**SUGGESTED READINGS:**


1 Subba Reddy, S. and P. Raghuram, P., Sastry, T.V.N. and Bhavani Devi, I. ( 2016). Agricultural Economics. Oxford &IBH Publishing Company Private Ltd. New Delhi.
2 Mukhi, H.R. (1983). Cooperation in India and Abroad. New Heights Publishers, New Delhi.
3 Muniraj,R. (1987). Farm Finance for Development. Oxford &IBH Publishing Company Ltd., New Delhi.
4 John, J. Hamptron. (1983). Financial decision making: Concepts, Problems and Cases of India. New Delhi John,

**B.Sc. (Hons.) Agriculture (Semester-III)**

**(Session: 2019-20)**

**Course Code: BACM-3138**

# STATISTICAL METHODS

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Get introduced with Statistics and its application in Agriculture.

**CO2:** Learn about graphical representation of data, measures of central tendancy & dispersion, correlation & regression.

**CO3:** Get familiarize with test of significance, chi-square test, ANOVA test etc.

**CO4:** Know about various sampling methods.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3138**

# STATISTICAL METHODS

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 25**

**Practical: 15**

**C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

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

### Unit – II

Definition of Correlation, Scatter Diagram. Karl Pearson's Coefficient of Correlation. Linear Regression Equations. Introduction to Test of Significance, One sample & two sample test t for Means

### Unit – III

Chi-Square Test of Independence of Attributes in 2 X 2 contingency table. Introduction to Analysis of Variance, Analysis of One Way Classification.

### Unit – IV

Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement.

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: BACM-3138**

# STATISTICAL METHODS

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about graphical representation of data.

**CO2:** Practice measures of central tendancy and dispersion of various forms of data.

**CO3:** Get introduced with moments, correlation & regression analysis.

**CO4:** Acquaint with the knowledge of one-sample and two-sample t-test, chi-square test.

**CO5:** Learn about One way ANOVA.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: BACM-3138**

# STATISTICAL METHODS

(PRACTICALS)

**Time: 3 Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1 Graphical Representation of Data.
2 Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles.
3 Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles.
4 Measures of Dispersion (Ungrouped Data).
5 Measures of Dispersion (Grouped Data).
6 Moments, Correlation & Regression Analysis.
7 Application of One Sample t-test and Two Sample Fisher's t-test.
8 Chi-Square test of Goodness of Fit and Chi-Square test of Independence of Attributes for 2 X 2 contingency table.
9 Analysis of Variance One Way Classification. Analysis of one way.
10 Analysis of variance in two-way (Factorial analysis).

**SUGGESTED READINGS**


1 Chandel SRS. Hand Book of Agricultural Statistics. Achal Prakashan Mandir Publications, New Delhi.
2 Dhamu K.P. & Ramamoorthy K. (2009). Fundamentals of Agricultural Statistics. Scientific Publishers.
3 Nageswara Rao, G (2007). Statistics for Agricultural Sciences. B.S Publications, Hyderabad.
4 Rangaswamy R (1995). A Text Book of Agricultural Statistics. New Age International (P) Ltd., Publishers, Hyderabad.

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: AECE-3221**

# ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Understand about value of natural resources like forest, water, minerals, energy, land and associated problems

**CO2:** Basic ecological principles, ecosystem and its functions

**CO3:** Learn about conservation of biodiversity, environmental pollution in relation with human population and other social issues.

**CO4:** Learn all about natural as well as man made disasters and their management practices.

# B.Sc. (Hons.) Agriculture (Semester-IV)
# (Session: 2019-20)

**Course Code: AECE-3221**

# ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 75**

**Theory: 40**

**Practical: 20**

**C.A: 15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

## Unit – I

Multidisciplinary nature of environmental studies Definition, scope and importance. Natural Resources: Renewable and non-renewable resources, Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

## Unit – II

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) 106 107 Report of the ICAR Fifth Deans' Committee Report of the ICAR Fifth Deans' Committee Biodiversity and its conservation: - Introduction, definition, genetic, species & ecosystem diversity and biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.

Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-sports of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

**Unit – III**

Environmental Pollution: definition, cause, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Social Issues and the Environment: From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. Environment and human health: Human Rights, Value Education, HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health.

**Unit – IV**

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion. Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents. Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community –based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

**B.Sc. (Hons.) Agriculture (Semester-III)**
**(Session: 2019-20)**

**Course Code: AECE-3221**

# ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Understand pollution problems through case studies and field work.

**CO2:** Acquire skills in documentation of various environmental assets.

**CO3:** Learn about biodiversity in relation to different habitats and study different ecosystem.

**CO4:** Learn about dealing in emergency about with natural calamities.

## B.Sc. (Hons.) Agriculture (Semester-III)
## (Session: 2019-20)

**Course Code: AECE-3221**

# ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT

(PRACTICALS)

**Time: 3 Hrs** **Marks: 20**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1. Visit to the Agricultural field and study the components of agroecosystem.
2. Visit to the Pond/River ecosystem to study biotic and abiotic components.
3. Study the bioindicators of agro/pond/river ecosystem.
4. Visit to Botanical Garden or undisturbed forest.
5. Pollution case studies and pollution indicator plants/insects or birds.
6. Visit to the sewage treatment plants.
7. Estimation of chlorides in the effluent treatment.
8. Collection, processing and storage of industrial effluent samples.
9. Case Studies- Field work: Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain
10. Visit to a local polluted site-Urban/Rural/Industrial/ Agricultural.

**SUGGESTED READINGS**


1. Benny Joseph (2017). Environmental studies simplified. Tata McGraw Hill.
2. Cunningham W (2016). Principles of Environmental Science; Inquiry and application. McGraw Hill.
3. Moo-young M. (2007). Environmental biotechnology: principles and application. Springer.
4. Nagar Ranita (2010). Disaster Management. APH Publishing Corporation.
5. Narayan B. (2000). Disaster Management. APH Publishing Corporation.
6. Wong M.H. (2013). Environmental Contamination: Health risks & ecological restoration. CRC Press.

**B.Sc. (Hons.) Agriculture (Semester-IV)**
**(Session: 2019-20)**

**Course Code: BACM-4011**

# CROP PRODUCTION TECHNOLOGY-II (*RABI CROPS*)

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:**Understand about crop husbandry of different kharif crops.

**CO2:** Learn the scientific management of different field, cereals, pulses and oilseeds crops

**CO3:** Understand agronomic practices of medicinal and aromatic crops.

**CO4**: Learn about post-harvest management principles of cereals, pulses and oilseeds crops.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM-4011**

# CROP PRODUCTION TECHNOLOGY-II (*RABI CROPS*)

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 25**

**Practical: 15**

**C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of cereals –wheat and barley.

### Unit – II

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of pulses-chickpea, lentil, peas & oilseeds-rapeseed, mustard and sunflower.

### Unit – III

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield ofsugar crops-sugarcane; medicinal and aromatic crops-mentha, lemon grass and citronella.

### Unit – IV

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of forage crops-berseem, lucerne and oat

**B.Sc. (Hons.) Agriculture (Semester-IV)**

**(Session: 2019-20)**

**Course Code: BACM-4011**

# CROP PRODUCTION TECHNOLOGY-II (*RABI CROPS*)

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about sowing practices of Rabi crops.

**CO2:** Identify morphological differences of various rabi crops and their weeds.

**CO3:** Understand yield contributing characters of rabi crops.

**CO4:** Learn about forage crops and oil extraction from medicinal crops.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM-4011**

# CROP PRODUCTION TECHNOLOGY-II (*RABI CROPS*)

(PRACTICALS)

**Time: 3 Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1 Sowing methods of wheat and sugarcane.
2 Study of morphological characteristics of rabi crops.
3 Identification of weeds in rabi season crops.
4 Study of yield contributing characters of rabi season crops.
5 Study of yield and juice quality analysis of sugarcane.
6 Study of important agronomic experiments of rabi crops at experimental farms.
7 Study of rabi forage experiments.
8 Study of oil extraction of medicinal crops.
9 Visit to research stations of related crops.

**SUGGESTED READINGS**


1. Anonymous (2018) Package of practices for cultivation of Rabi Crops, Punjab Agricultural University, Ludhiana
2. Chandrasekaran B, Annadurai. (2018). Textbook of Agronomy. New age publication.
3. Panda S C (2014). Forage crops and grasses. Agrobios
4. Reddy, S.R. and Reddi Ramu. 5th edition. Agronomy of Field Crops, Kalyani Publishers, New Delhi.
5. Singh S.S and Singh Rajesh (2018). Principles and practices of agronomy. Kalyani Publishers, New Delhi.
6. Tomar Suresh Singh, Mishra Y (2018). Production technology of RABI crops. Biotech

**B.Sc. (Hons.) Agriculture (Semester-IV)**
**(Session: 2019-20)**

**Course Code: BACM-4012**

# PRODUCTION TECHNOLOGY FOR ORNAMENTAL CROPS, MAPs AND LANDSCAPING

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about importance and scope of ornamental crops and MAPs.

**CO2:** Know about principles of landscaping and landscape use of plants.

**CO3:** Acquire knowledge about production technology of important cut flowers in both protected and open conditions.

**CO4:** Learn about cultivation practices of loose flowers under open conditions, processing and value addition.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM-4012**

# PRODUCTION TECHNOLOGY FOR ORNAMENTAL CROPS, MAPs AND LANDSCAPING

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 25**

**Practical: 15**

**C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

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

### Unit – II

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

### Unit – III

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.

### Unit – IV

Production technology of importantaromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver. Processing and value addition in ornamental crops and MAPs produce.

**B.Sc. (Hons.) Agriculture (Semester-IV)**

**(Session: 2019-20)**

**Course Code: BACM-4012**

# PRODUCTION TECHNOLOGY FOR ORNAMENTAL CROPS, MAPs AND LANDSCAPING

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Gain skills in identifying ornamentals, medicinal & aromatic plants.

**CO2:** Learn to prepare nursery bed, seed sowing, training & pruning techniques.

**CO3:** Design the layout of different styles of gardening.

**CO4:** Post harvest management of ornamental crop flowers

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM-4012**

# PRODUCTION TECHNOLOGY FOR ORNAMENTAL CROPS, MAPs AND LANDSCAPING

(PRACTICALS)

**Time: 3 Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1 Identification of Ornamental plants.
2 Identification of Medicinal and Aromatic Plants.
3 Nursery bed preparation and seed sowing.
4 Training and pruning of Ornamental plants.
5 Planning and layout of garden.
6 Bed preparation and planting of MAP.
7 Protected structures – care and maintenance.
8 Intercultural operations in flowers and MAP.
9 Harvesting and post-harvest handling of cut and loose flowers.
10 Processing of MAP.
11 Visit to commercial flower/MAP unit.

**SUGGESTED READINGS**


1. Arora J.S. (2016). Introductory Ornamental Horticulture. Kalyani Publishers, New Delhi.
2. Joshi S. K. (2007). Medicinal plants. Oxford & IBH.
3. Grewal H.S & Parminder Singh. Landscape designing and ornamental plants. Kalyani Publishers, New Delhi.
4. Laurie, Alex and Ries, V.H. (2012). Floriculture fundamentals and practices. Agrobios
5. Prasad S and Bhardwaj, Raju L. (2016). Production technology of spices, aromatic, medicinal and plantation crops. Agrobios.
6. Randhawa G.S. and Mukhopadhyaya A. (1994). Floriculture in India. Allied Publishers Pvt. Ltd., New Delhi.
7. Raj, Desh (2017). Floriculture at a glance. Kalyani Publishers, New Delhi.

**B.Sc. (Hons.) Agriculture (Semester-IV)**
**(Session: 2019-20)**

**Course Code: BACM-4013**

# RENEWABLE ENERGY & GREEN TECHNOLOGY

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Know about various types of energy & importance in Agriculture.

**CO2:** Learn about biomass utilization, bio-fuel production and gasification

**CO3:** Learn about wind energy, its types and application

**CO4:** Familiarize with solar energy and its application and various solar gadgets.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM-4013**

# RENEWABLE ENERGY & GREEN TECHNOLOGY

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 25**

**Practical: 15**

**C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

**Unit – I**

Classification of energy sources and their contribution in Agricultural sector. Familiarization with biomass utilization for bio-fuel production and their application, types of biogas plants.,

**Unit – II**

Familiarization with types of biogas plants and gasifiers, biogas, bioalcohol, biodiesel and biooil production and their utilization as bioenergy resource.

**Unit – III**

Introduction to solar energy, collection and their applications. Familiarization with solar energy gadgets: solar cooker, solar water heater.

**Unit – IV**

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

**B.Sc. (Hons.) Agriculture (Semester-IV)**

**(Session: 2019-20)**

**Course Code: BACM-4013**

# RENEWABLE ENERGY & GREEN TECHNOLOGY

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about biogas plants and gasifiers.

**CO2:** Experience production process of bio-diesel & bio-fuels and about briquetting machine.

**CO3:** Gain an understanding of solar cooker, solar drying system & solar distillation.

**CO4:** Learn about performance of wind mill.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM-4013**

# RENEWABLE ENERGY & GREEN TECHNOLOGY

(PRACTICALS)

**Time: 3 Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1 Familiarization with renewable energy gadgets.
2 To study biogas plants.
3 To study Gasifiers.
4 To study the production process of bio diesel.
5 To study briquetting machine.
6 To study the production process of bio-fuels.
7 Familiarization with different solar energy gadgets.
8 To study solar photovoltaic system: solar light, solar pumping and solar fencing.
9 To study solar cooker.
10 To study solar drying system.
11 To study solar distillation and solar pond.
12 To study the performance of wind mill.

**SUGGESTED READINGS**


1. Chakravarthy A. and Amalendu Chakravarthy (1989). Biotechnology and other Alternative Technologies for Utilization of Biomass-Agriculture wastes. 1st edition, Oxford and IBH Publishers, New Delhi.
2. Rai G.D. (2004). Non-Conventional Energy Sources. Khanna Publishers, New Delhi.
3. Rajput R.K. (2012). Non-Conventional Energy Sources. S. Chand Publishers, New Delhi.
4. Rathore N.S., Mathur A.N. and S. Kothari. Alternate sources of energy. ICAR, New Delhi.
5. Tiwari G.N. (2012). Greenhouse technology for controlled environment. Narosa Pub.

**B.Sc. (Hons.) Agriculture (Semester-IV)**

**(Session: 2019-20)**

**Course Code: BACM-4014**

# PRODUCTION TECHNOLOGY FOR FRUITS AND PLANTATION CROPS

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about importance & scope of fruit and plantation crops.

**CO2:** Develop understanding of use of rootstock and high density planting.

**CO3:** Know about production technologies for cultivation of major and minor fruits.

**CO4:** Plan and lay out of the orchard and its management.

**B.Sc. (Hons.) Agriculture (Semester- IV)**
**(Session: 2019-20)**

**Course Code: BACM-4014**

# PRODUCTION TECHNOLOGY FOR FRUITS AND PLANTATION CROPS

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 50**
**Theory: 25**
**Practical: 15**
**C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

**Unit – I**

Importance and scope of fruit and plantation crop industry in India. Importance of rootstocks.

**Unit – II**

Production technologies for the cultivation of major fruits-mango, citrus, grape.

**Unit – III**

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

**Unit – IV**

Production technologies for the cultivation of minor fruits- pineapple, pomegranate, jackfruit, strawberry, cashew, tea, coffee.

**B.Sc. (Hons.) Agriculture (Semester- IV)**

**(Session: 2019-20)**

**Course Code: BACM-4014**

# PRODUCTION TECHNOLOGY FOR FRUITS AND PLANTATION CROPS

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about scarification, stratification & propagation of seeds.

**CO2:** Familiarize with propagation methods for fruit and plantation crops.

**CO3:** Describe & identify fruits along with their pests, diseases and physiological disorders.

**CO4:** Learn about preparation and usage of bio-regulators.

## B.Sc. (Hons.) Agriculture (Semester- IV)
## (Session: 2019-20)

**Course Code: BACM-4014**

# PRODUCTION TECHNOLOGY FOR FRUITS AND PLANTATION CROPS

(PRACTICALS)

**Time: 3 Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1 Seed propagation.
2 Scarification and stratification of seeds.
3 Propagation methods for fruit and plantation crops including Micro-propagation.
4 Description and identification of fruit.
5 Preparation of plant bio regulators and their uses.
6 Identification of Pests, diseases and physiological disorders of above fruit and plantation crops.
7 Use of girdling in grapes.
8 Pruning of grapes.
9 Fruit thinning.
10 Visit to commercial orchard.

**SUGGESTED REFERENCES**.


1. Bal J.S. (2014). Fruit Growing. Kalyani Publishers, New Delhi.
2. Bal, J.S. (2018). Fruit science Culture and technology V – I. NIPA.
3. Mishra Vishwanath and Chaturv. (2016). Handbook of practical horticulture. Kalyani Publishers, New Delhi.
4. Prasad, S. and Bharadwaj, R. L. (2015). Production technology of fruit crops. Agrobios.
5. Prasad S and Bhardwaj Raju L. (2016). Production technology of spices, aromatic, medicinal and plantation crops. Agrobios.
6. Singh Amar (2014). Fruit Physiology and Production. Kalyani Publisher, New Delhi.
7. Singh, S.P. (2017). Commercial fruits. Kalyani Publishers, New Delhi.

**B.Sc. (Hons.) Agriculture (Semester-IV)**

**(Session: 2019-20)**

**Course Code: BACM-4015**

# FARM MACHINERY AND POWER

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:**Learn about farm power machinery in India and its manufacturers.

**CO2:** Learn about the fundamentals of 2-stroke & 4-stroke engine and operating system of tractor.

**CO3:** Learn about primary & secondary implements and various sowing and intercultural operations.

**CO4:** Learn about plant protection equipment and harvesting & threshing equipments.

## B.Sc. (Hons.) Agriculture (Semester- IV)
## (Session: 2019-20)

**Course Code: BACM-4015**

# FARM MACHINERY AND POWER

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 25**

**Practical: 15**

**C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

Status of Farm power in India &Sources, IC engines, Working Principle of 2-stroke & 4-Stroke engine, study of different components of I.C engine,I.C engine terminology and solved problems, Familiarization with different systems of I.C engine: Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of tractor.

### Unit – II

Familiarization with Power transmission system: clutch, gear box, differential and final drive of a tractor, Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary & Secondary tillage implements, implement for hill agriculture.

### Unit – III

Implementation for intercultural operations, Familiarization with sowing & planting equipment, Calibration of seed drill and solved examples.

### Unit – IV

Familiarization with Plant protection equipment, Familiarization with Harvesting & Threshing equipment.

**B.Sc. (Hons.) Agriculture (Semester- IV)**
**(Session: 2019-20)**

**Course Code: BACM-4015**

# FARM MACHINERY AND POWER

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about different components of IC Engine.

**CO2:** Get aware of various operational systems of tractor.

**CO3:** Acquire knowledge about mould board, disc plough & disc harrow plough,

**CO4:** Get familiarize with application of seed-cum-fertilizer drill, types of sprayers & dusters, harvesting & threshing machinery.

## B.Sc. (Hons.) Agriculture (Semester- IV)
## (Session: 2019-20)

**Course Code: BACM-4015**

# FARM MACHINERY AND POWER

(PRACTICALS)

**Time: 3 Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1. Study of different Components of IC engine.
2. To study air cleaning and cooling system of engine
3. Familiarization with Clutch, Transmission, Differential and Final drive of tractor.
4. Familiarization with lubrication and fuel supply system of engine.
5. Familiarization with Brake, Steering, Hydraulic Control system of engine
6. Learning of tractor driving.
7. Operation of Power tillers.
8. Implements for hill agriculture.
9. Familiarization with different types of primary and secondary tillage implements: mould board plough, disc plough and disc harrow
10. Study of seed-cum-fertilizer drills their seed metering mechanism and calibration, planters and transplanter.
11. Familiarization with different types of sprayers & dusters.
12. Familiarization with Harvesting and Threshing equipment.

**SUGGESTED READINGS**


1. Jain, S.C. and Rai, C.R. Farm Tractor: maintenance and repair. Standard Publishers Distributors.
2. Ojha T.P. and Michael A.M. (2018). Principles of Agricultural Engineering. Vol.I. Jain brothers, New Delhi.
3. Sahay Jagdishwar (2018). Elements of agricultural engineering. Standard Publishers Distributors.
4. Selvam, R.K.Veera (2016). Farm machinery and power. Oxford & IBH.
5. Surendra Singh- Farm machinery –Principles and applications, ICAR, New Delhi.

**B.Sc. (Hons.) Agriculture (Semester-IV)**

**(Session: 2019-20)**

**Course Code: BACL-4016**

# FARMING SYSTEM AND SUSTAINABLE AGRICULTURE

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Understand about cropping systems &patterns and evaluation methods.

**CO2:** Recognize various tools for determining efficiency of farming systems..

**CO3:** Understand sustainable and conservation Agriculture problems and impact

**CO4:** Understand value of Integrated Farming System and its models.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACL-4016**

# FARMING SYSTEM AND SUSTAINABLE AGRICULTURE

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 25**

**Theory: 20**

**C.A: 5**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

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.

### Unit – II

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.

### Unit – III

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, resource use efficiency and optimization techniques.

### Unit – IV

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.

**SUGGESTED READINGS**


1. Dahama A.K. (2018). Organic farming for sustainable agriculture. Agrobios (India), Jodhpur.
2. Heege Hermann J. (2013). Precision in crop farming. Springer Netherland.
3. Joshi, Mukund (2015). Sustainability through organic farming. Kalyani Publishers, New Delhi.
4. Panda S C (2017). Organic farming for sustainable agriculture. Kalyani Publishers, New Delhi.
5. Reddy S R (2016). Farming system and sustainable agriculture. Kalyani Publishers, New Delhi.

**B.Sc. (Hons.) Agriculture (Semester-IV)**
**(Session: 2019-20)**

**Course Code: BACM-4017**

# LIVESTOCK AND POULTRY MANAGEMENT

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Understand role of livestock in rural household and Indian economy.

**CO2:** Know about reproduction in farm animals & poultry.

**CO3:** Familiarize with management principles of livestock & poultry.

**CO4:** Learn about exotic breeds of livestock & poultry and disease management.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM-4017**

# LIVESTOCK AND POULTRY MANAGEMENT

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 100**

**Theory: 60**

**Practical: 20**

**C.A: 20**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. Management of calves, growing heifers and milch animals.

### Unit – II

Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers. Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry.

### Unit – III

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.

### Unit – IV

Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.

**B.Sc. (Hons.) Agriculture (Semester-IV)**
**(Session: 2019-20)**

**Course Code: BACM-4017**

# LIVESTOCK AND POULTRY MANAGEMENT

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about planning and layout of housing for various types of livestock.

**CO2** Learn about management techniques of livestock and poultry

**CO3:** Understand and develop formulation of concentrate mixtures for livestock.

**CO4** Learnabouteconomics of livestock and poultry farm.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM-4017**

# LIVESTOCK AND POULTRY MANAGEMENT

(PRACTICALS)

**Time: 3 Hrs** **Marks: 20**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

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. Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records.
5. Judging of cattle, buffalo and poultry.
6. Culling of livestock and poultry.
7. Planning and layout of housing for different types of livestock.
8. Computation of rations for livestock and formulation of concentrate mixtures.
9. Hatchery operations, incubation and hatching equipments.
10. Management of chicks, growers and layers.
11. Debeaking, dusting and vaccination.
12. Economics of cattle, buffalo, sheep, goat, swine and poultry production.

**SUGGESTED READINGS**


1. Benerjee, G.C (ed.), 1998. A Textbook of Animal Husbandry, Oxford & IBH Publishing Company Ltd., New Delhi.
2. Dhama, P S. A Handbook of Animal Husbandry. ICAR, New Delhi.
3. Prasad, Jagdish (2016). Principles and Practices of dairy farm management. Kalyani Publishers, New Delhi.
4. Sastri N S R, Thomas C K, Singh R A (2015).Livestock Production and Management. Kalyani Publishers, New Delhi.
5. Singh Prakash (2018). Modern livestock and poultry production. Biotech
6. Tomar S.S (2016). Textbook of animal breeding. Kalyani Publishers, New Delhi.

**B.Sc. (Hons.) Agriculture (Semester-IV)**

**(Session: 2019-20)**

**Course Code: BACM-4128**

# AGRI-INFORMATICS

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about computers and various operating systems.

**CO2:** Work with applications of MS office, database and use in Agriculture

**CO3:** Use e-Agriculture and exploitation of ICT tools in Agriculture.

**CO4:** Understand computer models for agricultural production.

## B.Sc. (Hons.) Agriculture (Semester- IV)
## (Session: 2019-20)

**Course Code: BACM-4128**

# AGRI-INFORMATICS

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 50**

**Theory: 25**

**Practical: 15**

**C.A: 10**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

**Unit – I**

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, Database, concepts and types, uses of DBMS in Agriculture.

**Unit – II**

World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations, e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models for understanding plant processes.

**Unit – III**

IT application for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc, Geospatial technology for generating valuable agri-information.

**Unit – IV**

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.

**B.Sc. (Hons.) Agriculture (Semester- IV)**
**(Session: 2019-20)**

**Course Code: BACM-4128**

# AGRI-INFORMATICS

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about computer and its various components and different operating

**CO2:** Use MS Word, MS PowerPoint and MS Excel

**CO3:** Acquire knowledge about World Wide Web as well as programming languages.

**CO4:** Understand Crop Simulation Models and computation of water and nutrient requirements of crop IT tools.

## B.Sc. (Hons.) Agriculture (Semester- IV)
## (Session: 2019-20)

**Course Code: BACM-4128**

# AGRI-INFORMATICS

(PRACTICALS)

**Time: 3 Hrs** **Marks: 15**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1 Study of Computer Components, accessories, practice of important DOS Commands.
2 Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management.
3 Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document.
4 Use of MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data.
5 Use of MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system.
6 Introduction to World Wide Web (WWW). Introduction of programming languages.
7 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.
8 Hands on Decision Support System.
9 Preparation of contingent crop planning.

**SUGGESTED READINGS**

1 Vanitha G (2011). Agro-Informatics. New India Publishing Agency.

**ADDITIONAL RESOURCES:**

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

**B.Sc. (Hons.) Agriculture (Semester-IV)**

**(Session: 2019-20)**

**Course Code: BACM-4099**

# AGRICULTURAL MARKETING, TRADE &PRICES

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Understand the concept, structure and classification of Agricultural Marketing.

**CO2:** Have knowledge about meaning, stages, characteristics, strategies and pricing of product Life Cycle.

**CO3:** Learn about role of Government in Agricultural Marketing.

**CO4:** Describe concept of International Trade and its need, present status and prospects of international trade in agri-commodities.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM-4099**

# AGRICULTURAL MARKETING, TRADE &PRICES

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 75**

**Theory: 40**

**Practical: 20**

**C.A: 15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

### Unit – I

Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation, 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

### Unit – II

Product life cycle (PLC) and competitive strategies: Meaning and stages in PLC; characteristics of PLC; strategies in different stages of PLC; pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits; marketing process and functions: Marketing process-concentration, dispersion and equalization; exchange functions – buying and selling; physical functions – storage, transport and processing; cilitating functions – packaging, branding, grading, quality control and labeling (Agmark).

### Unit – III

Market functionaries and marketing channels: 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; Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions; cooperative marketing in India.

**Unit – IV**

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 Tradeand its need, theories of absolute and comparative advantage. Present status and prospects of international trade in agri-commodities; GATT and WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR.

**B.Sc. (Hons.) Agriculture (Semester-IV)**
**(Session: 2019-20)**

**Course Code: BACM-4099**

# AGRICULTURAL MARKETING, TRADE &PRICES

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Study relationship between market arrivals and prices of commodities.

**CO2:** Acquire knowledge about computation of marketable and marketed surplus of important commodities.

**CO3:** Study various marketing functions performed by different agencies.

**CO4:** Learn the application of principles of comparative advantage of international trade.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM-4099**

# AGRICULTURAL MARKETING, TRADE &PRICES

(PRACTICALS)

**Time: 3 Hrs** **Marks: 20**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1. Plotting and study of demand and supply curves and calculation of elasticities.
2. Study of relationship between market arrivals and prices of some selected commodities.
3. Computation of marketable and marketed surplus of important commodities.
4. Study of price behaviour over time for some selected commodities.
5. Construction of index numbers.
6. Visit to a local market to study various marketing functions performed by different agencies.
7. Identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class.
8. Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning.
9. Application of principles of comparative advantage of international trade.

**SUGGESTED READINGS**


1 Acharya, S.S and Agarwal, N. (2017). Agricultural Marketing in India. Oxford & IBM.
2 Panda S.C (2010). Farm Management and Agricultural Marketing. Kalyani Publishers, New Delhi.
3 Reddy S. Subba, Devi Bhava (2012). Agricultural Economics. Oxford & IBH Publishing Co. Pvt. Ltd.

**B.Sc. (Hons.) Agriculture (Semester-IV)**
**(Session: 2019-20)**

**Course Code: BACM- 4010 (OPT-I)**

# BIOPESTICIDES & BIOFERTILIZERS

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Get introduced with the concept, importance and scope of biopesticide and biofertilizers.

**CO2:** Know about characteristics of various biopesticides and biofertilizers.

**CO3:** Familiarize with methods of application, production and quality control of biopesticides as well as biofertilizers.

**CO4:** Learn about limitations and factors influencing efficacy of biopesticides and biofertilizers.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM- 4010 (OPT-I)**

# BIOPESTICIDES & BIOFERTILIZERS

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 75**

**Theory: 40**

**Practical: 20**

**C.A: 15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

**Unit – I**

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

**Unit – II**

Botanicals and their uses. 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.

**Unit – III**

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- AM mycorrhiza and ectomycorhiza. Nitrogen fixation -Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K solubilization.

**Unit – IV**

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)**
**(Session: 2019-20)**

**Course Code: BACM- 4010 (OPT-I)**

# BIOPESTICIDES & BIOFERTILIZERS

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about isolation and purification of biopesticides and biofertilizers.

**CO2** Learn about identification and multiplication of biopesticides.

**CO3:** Understand the methodology of mass multiplication and inoculum production of biofertilizers.

**CO4** Learnaboutmass production of AM inoculations.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM- 4010 (OPT-I)**

# BIOPESTICIDES & BIOFERTILIZERS

(PRACTICALS)

**Time: 3 Hrs** **Marks: 20**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1 Isolation and purification of important biopesticides: *Trichoderma Pseudomonas, Bacillus metarhyzium* etc. and its production.
2 Identification of important botanicals.
3 Visit to biopesticide laboratory in nearby area.
4 Field visit to explore naturally infected cadavers.
5 Identification of entomopathogenic entities in field condition.
6 Quality control of biopesticides.
7 Isolation and purification of *Azospirillum , Azotobacter, Rhizobium*, P-solubilizers and cyanobacteria.
8 Mass multiplication and inoculums production of biofertilizers.
9 Isolation of AM Fungi -Wet sieving method and sucrose gradient method. Mass production of AM inoculants.

**SUGGESTED READINGS**


1 Ghosh G.K. Biopesticide and integrated pest management. A.P.H
2 Kanniyan S, Kumar K and Govi (2013). Biofertilizers technology. Scientific Publications.
3 Panda H (2011). Manufacture of Biofertilizer and Organic Farming. Asia Pacific Business.
4 Rai, M. K. (2006). Handbook of Microbial Biofertilizers. IBDC
5 Somani, L.L. (2009). Handbook of biofertilisers. ATPA
6 Sharma R.A et.al (2004). Biofertilizer technology. ATPA
7 Tiwari, V.N and Pandey, M.R (2015). Organic agriculture and biopesticides. Agrobios

**B.Sc. (Hons.) Agriculture (Semester-IV)**
**(Session: 2019-20)**

**Course Code: BACM- 4010 (OPT-II)**

# LANDSCAPING

(THEORY)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Get introduced with the concept, importance, scope and principles of landscaping.

**CO2:** Know about propagation, planting scheme and management of various ornamental trees, shrubs, climbers, herbaceous perennials, succulents etc.

**CO3:** Familiarize with Bio-aesthetic planning and landscaping of urban, rural, peri-urban areas as well as schools, hospitals, industries, airport etc.

**CO4:** Learn about principles and management of Bonsai as well as establishment of lawns.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM- 4010 (OPT-II)**

# LANDSCAPING

(THEORY)

**Time: 3 Hrs.** **Max. Marks: 75**

**Theory: 40**

**Practical: 20**

**C.A: 15**

**Instructions for the Paper Setter**

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. 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.

**Unit – I**

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.

**Unit – II**

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

**Unit – III**

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,

**Unit – IV**

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-IV)**
**(Session: 2019-20)**

**Course Code: BACM- 4010 (OPT-I)**

# LANDSCAPING

(PRACTICAL)

## COURSE OUTCOMES (CO):

After passing this course student will be able to:

**CO1:** Learn about identification, propagation and maintenance of trees, shrubs, annuals, pot plants etc.

**CO2** Learn about identification of tools and implements used in landscaping.

**CO3:** Get skills in layout of formal, informal and special type of gardens.

**CO4** Learnaboutuse of computer software for landscaping.

## B.Sc. (Hons.) Agriculture (Semester-IV)
## (Session: 2019-20)

**Course Code: BACM- 4010 (OPT-I)**

# LANDSCAPING

(PRACTICALS)

**Time: 3 Hrs** **Marks: 20**

**Instructions for Practical Examiner:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

**LIST OF EXPERIMENTS**

1. Identification of trees, shrubs, annuals, pot plants.
2. Propagation of trees, shrubs and annuals.
3. Care and maintenance of plants, potting and repotting.
4. Identification of tools and implements used in landscape design.
5. Training and pruning of plants for special effects.
6. Lawn establishment and maintenance.
7. Layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden)and designing of conservatory and lathe house.
8. Use of computer software.
9. Visit to important gardens/ parks/ institutes.

**SUGGESTED READINGS**


1. Ashraf, Syed Mahboob (2012). Handbook of landscape gardening and environment. Agrobios
2. Grewal, H.S and Parminder Singh (2014). Landscape designing and ornamental plants. Kalyani Publishers, New Delhi.
3. Trivedi Pratibha P (2014). Home gardening. ICAR, New Delhi.
4. Raj, Desh (2017). Floriculture at a glance. Kalyani Publishers, New Delhi.
5. Laurie, Alex and Ries, V.H (2012). Floriculture fundamentals and practices. Agrobios
6. Randhawa G.S and Mukhopadhyay (2016). Floriculture in India. Allied Publishers