FACULTY OF SCIENCES

SYLLABUS

FOR

Bachelor of Vocation (B.Voc.)
(AGRI FOOD SCIENCE)
(SEMESTER: I-II)

Examinations: 2019-20

GURU NANAK DEV UNIVERSITY
AMRITSAR

Note:  
(i) Copy rights are reserved.  
Nobody is allowed to print it in any form.  
Defaulters will be prosecuted.

(ii) Subject to change in the syllabi at any time.  
Please visit the University website time to time.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER SYSTEM)

SCHEME

Semester-I

(Aligned with Level 4 of Sector Skill Council- Qualification Pack- Assistant Lab Technician Food and Agricultural Commodities (FIC/Q7601)

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Subject</th>
<th>Credits</th>
<th>Theory Marks</th>
<th>Duration</th>
<th>Practical Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAPER-I</td>
<td>Communication Skills in English-I</td>
<td>3</td>
<td>50</td>
<td>3 hrs</td>
<td>-</td>
<td>50</td>
</tr>
<tr>
<td>PAPER-II</td>
<td>Punjabi Compulsory OR *ਪੰਜਾਬੀ ਪੰਜਾਬੀ OR **Punjab History &amp; Culture</td>
<td>3</td>
<td>50</td>
<td>3 hrs</td>
<td>-</td>
<td>50</td>
</tr>
<tr>
<td>PAPER-III</td>
<td>***Drug Abuse: Problem, Management and Prevention (Compulsory)</td>
<td>3</td>
<td>50</td>
<td>3 hrs</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

GENERAL EDUCATION COMPONENT

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Subject</th>
<th>Credits</th>
<th>Theory Marks</th>
<th>Duration</th>
<th>Practical Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAPER-IV</td>
<td>Introduction to Food Science</td>
<td>6+3</td>
<td>75</td>
<td>3 hrs</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>PAPER-V</td>
<td>Crop Science</td>
<td>6+3</td>
<td>75</td>
<td>3 hrs</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>PAPER-VI</td>
<td>Fundamentals of Biochemistry</td>
<td>6+3</td>
<td>75</td>
<td>3 hrs</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>PAPER-VII</td>
<td>Industrial Training</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>S/US</td>
</tr>
</tbody>
</table>

TOTAL= 400

Note:
2. **For those students who are not domicile of Punjab
3. ***This paper marks will not be included in the total marks.
### BACHELOR OF VOCATION (B.Voc.)  
(AGRI FOOD SCIENCE) (SEMESTER SYSTEM)

**SEMESTER-II**  
(Aligned with Level 5 of Sector Skill Council- Qualification Pack- Food Products Packing Technician (FIC/Q7001))

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Subject</th>
<th>Credits</th>
<th>Theory Marks</th>
<th>Practical Marks</th>
<th>Duration</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERAL EDUCATION COMPONENT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PAPER-I</strong></td>
<td>Communication Skills in English-II</td>
<td>3</td>
<td>50</td>
<td>-</td>
<td>3 hrs</td>
<td>50</td>
</tr>
</tbody>
</table>
| **PAPER-II** | Punjabi Compulsory  
OR  
*ਪੰਜਾਬੀ ਪੜਨਪੜੀ/  
OR  
**Punjab History & Culture | 3 | 50 | - | 3 hrs | 50 |
| **PAPER-III** | ***Drug Abuse: Problem, Management and Prevention (Compulsory) | 3 | 50 | - | 3 hrs | - |
| **SKILL COMPONENT** | | | | | | |
| **PAPER-IV** | Fundamentals of Genetics | 6+3 | 75 | 25 | 3 hrs | 100 |
| **PAPER-V** | Food Processing | 6+3 | 75 | 25 | 3 hrs | 100 |
| **PAPER-VI** | Crop Physiology | 6+3 | 75 | 25 | 3 hrs | 100 |
| **PAPER-VII** | Industrial Training | 2 | - | - | | S/US |

**TOTAL=** 400

**Note:**
2. **For those students who are not domicile of Punjab
3. ***This paper marks will not be included in the total marks.
**Semester-III**

(Aligned with Level 6 of Sector Skill Council- Qualification Pack- Food Regulatory Affair Manager (FIC/Q9002))

<table>
<thead>
<tr>
<th>PAPER</th>
<th>Subjects</th>
<th>Credit Hours</th>
<th>Theory Marks</th>
<th>Practical Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAPER-I</td>
<td>Basics of Computers</td>
<td>3</td>
<td>50</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td><strong>General Education Component:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAPER-II</td>
<td>Analytical Techniques</td>
<td>3+3</td>
<td>50</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>PAPER-III</td>
<td>Crop Production</td>
<td>3+3</td>
<td>50</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>PAPER-IV</td>
<td>Introductory Microbiology</td>
<td>3+3</td>
<td>50</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>PAPER-V</td>
<td>Food Biotechnology</td>
<td>3+3</td>
<td>50</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>
BACHELOR OF VOCATION (B.Voc.)  
(AGRI FOOD SCIENCE) (SEMESTER SYSTEM)

Semester-IV  
(Aligned with Level 6 of Sector Skill Council- Qualification Pack- Food Regulatory Affair Manager (FIC/Q9002)

<table>
<thead>
<tr>
<th>PAPER</th>
<th>Subjects</th>
<th>Credit Hours</th>
<th>Theory Marks</th>
<th>Practical Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>General Education Component:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAPER-I *Environmental Studies (Compulsory)</td>
<td>3</td>
<td>75</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>PAPER-II Environment Impact Assessment</td>
<td>3</td>
<td>100</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td><strong>Skill Component:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAPER-III Plant Pathology and Crop Disease Management</td>
<td>3+3</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>PAPER-IV Food Legislation &amp; Quality Systems</td>
<td>3+3</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>PAPER-V Food Plant Layout &amp; Sanitation</td>
<td>3+3</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>PAPER-VI Industrial Training</td>
<td>3+3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Marks will not be included in the total marks.
BACHELOR OF VOCATION (B.Voc.)  
(AGRI FOOD SCIENCE) (SEMESTER-I)  

Paper-I: COMMUNICATION SKILLS IN ENGLISH-I  

Time: 3 Hours  
Max. Marks: 50  

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

The syllabus is divided in four sections as mentioned below:

Section–A  
Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings.

Section–B  
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

Section–C  
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

Section–D  
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:
2. English Grammar in Use (Fourth Edition) by Raymond Murphy, CUP
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-I)

Paper-II: पृष्ठांश (छंतामी)

मान्य : 3 पटे

बंटी भाग : 50

1. पृष्ठा पृष्ठा ते चाह जगा तेसता। उद जगा डिच्यं ते पृष्ठा पृष्ठा चाहता।
2. चिन्तिससी पृष्ठा पृष्ठा चाहता उदा। उद जगा डिच्यं तें पृष्ठा जगा तें।
3. पृष्ठा पृष्ठा चाहता वन जगा तें।
4. धारा पृष्ठा पृष्ठा चाहता चाहता उं पृष्ठा पृष्ठा चाहता उं।

धारा-धारा अष्ट धारा-धारा राखा

मेलमत-पक्ष

अध्याय-अध्याय (बिंदु बिंदु)
(भाषि: सुशीला माँ अतु दिक्काम उपित मंगो)
ताता ताता ते दिक्काम उपित मंगो।
(भूमिका मारुत आभाराम, माता)

मेलमत-पक्ष

धिलिगमत धारा-धारा (धिलिगमत देख-देखुँ)
मेला: म.म.भेरें, भेंसी मारुत पृष्ठा-पृष्ठा।
(खें 1 ते 6)
(विबंध दें मात, लिख-लेखी)

मेलमत-पक्ष

(व) पेंदा वलंगा
(अ) पेंदा वलंगा ते पृष्ठा-पृष्ठा ते हूंडा।

मेलमत-पक्ष

(व) पृष्ठा-पृष्ठा धिलिगमत - हूंडा एंड, हूंडा मारुत ते धिलिगमत, मात, धिलिगमत,
(अ) धारा पृष्ठा-धारा: धारा ता उत्तरार्द्धी धारा, धारा ते ढूंढ-ढूंढा ता बंडुंडा। पृष्ठा-पृष्ठा
(ढूंढा-ढूंढा) ते पड़ता-ढूंढा।
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-I)

Paper-II: पृष्ठस्थि पास्त्रि
(In lieu of Compulsory Punjabi)

भा.-२ के अन्यत्र भौतिकभाव लिखी उत्तरहित

1. भूमि भेंट दे चुन बना उठाने। उत बना हिचि दे भूमि पूंछे लाटो।
2. विकल्पात्मक है बूंढ़ भूमि पूरा भिजे उठा। उत बना हिचि दिशा भूमि समाप्ति है।
3. रक्तक पूरा दे घायल भूमि उठा।
4. भेंट मैंट बना दास रंगो बनि उं भूमि जों डूंप दे डूंप चुन घुल-पुरा दिशा उत मजावा है।

पृष्ठ-बूढ़

मेलमार-दे

पेड़ी खोंबी, भूमि बूढ़, पेट दिनी हिले दास भे मैंट हिच मैंट दे दास भे मैंट भे मैंट-पूरा (पृष्ठस्थि नारा-छाड़)
शृंगार (सींही, टिर्पी, ऑफ़) : पृष्ठ अने उठाओ

मेलमार-शी

भूमि मान-मलङश्वा : पृष्ठस्थि नारा-छाड़
(मछला मवट, मेंजुंड मवट, भिराव मवट, भूत मवट, भूज़ू मवट, भूज़ू मवट, भीतर अवे विलेवर)

मेलमार-मी

हिंड़ उठाओ से भूमि मकरनस्थि : घम्बात, दास, विमाउ-उठाओ, गेढ़ी अने उं घुंडा भे अभि ताड़ मलबाद

मेलमार-की

उड़ाए दे मैंट हिचि दे सं, बाँझ भूतिकहं दे सं, उड़ाए दे सं, हिचि दे में उं घिनी मकरनस्थि हिचि।
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-I)

Paper-II: Punjab History & Culture (From Earliest Times to C 320)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours Max. Marks: 50

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

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

Section B
3. Harappan Civilization: Town planning; social, economic and religious life of the Indus Valley People.

Section C
5. Social, Religious and Economic life during Rig Vedic Age.

Section D
7. Teachings and impact of Buddhism
8. Jainism in the Punjab

Suggested Readings
1. L. M Joshi (ed.), History and Culture of the Punjab, Art-I, Patiala, 1989 (3rd edition)
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-I)

Paper-III: Drug Abuse: Problem, Management and Prevention
(COMPULSORY PAPER)

PROBLEM OF DRUG ABUSE

Time: 3 Hours Max. Marks: 50

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

Section – A

Meaning of Drug Abuse:

Section – B

Consequences of Drug Abuse for:
- Family : Violence.
- Society : Crime.
- Nation : Law and Order problem.

Section – C

Management of Drug Abuse:
Medical Management: Medication for treatment and to reduce withdrawal effects.

Section – D

Psychiatric Management: Counselling, Behavioural and Cognitive therapy.
Social Management: Family, Group therapy and Environmental Intervention.

References:
1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-I)

PAPER-IV : Introduction to Food Science (Theory)

Time: 3 Hours

Max. Marks: 75

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

SECTION-A
Food science introduction and significance, Constituents of food and their importance, Nutritive aspect of food constituents .methods of cooking of foods and changes during cooking and processing. Non nutritional constituents and food safety, food adulteration.

SECTION-B
Cereal and legumes: Cereals grains, structure and Composition, Milling of wheat, rice and maize,
Parboiling of rice, brief introduction to baking and breakfast cereals.
Nutritive value of pulses and their processing,
Composition and nutritive value fruits and vegetables, ripening and storage, nutritional aspects of raw and processed vegetables and fruits.

SECTION-C
Composition and nutritive value of milk and milk products, milk processing- clarification, pasteurization and homogenization. Evaporated milk
Structure, composition, quality, nutritive value and processing of egg, meat, poultry and fish.

SECTION-D
Manufacture of different types of sugar (sugar, jaggery, honey, and syrup), caramelization, hydrolysis and crystallization of sugars. Ingredients of confectionery, Chocolate and Indian confectionery
Sources and processing of fats and oils. Food adjuncts- spices, condiments, herbs, food colors and flavors- classification and uses in Indian cookery.
Introduction to Food Science (PRACTICAL)

Time: 3 Hours

Max. Marks: 25

1. To identify the food sources for various nutrients
2. Planning of diet for children, adults and old people
3. To determine physical characteristics of cereal grains
4. To study the ripening of fruits and vegetables.
5. Separation, neutralization and ripening of milk cream
7. To perform sampling test of milk.
8. Preparation of caramel and candies.
9. Identification of different spices and adulteration in them.

Recommended Books:

1. Food Processing and Preservation- Subbulaksmi G., and Udipi S.
4. Food Science- Potter, CBS publishers.
5. Technology of Food Preservation - N.W. Desroiser and N.W. Desrosier
6. Introduction to Food Science & Technology- G.P. Stewart & M.A. Amerine
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-I)

PAPER-V : Crop Science (Theory)

Time: 3 Hours                                      Max. Marks: 75

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

SECTION-A
Introduction to Crop Science: importance of crop plants used as food, feed, fiber and fuel; historical significance, world population and food supply; origin, classification and geographical distribution of field crops; plant life cycle

SECTION-B
Growth and development of crop plants: botany of plants, anatomy, morphology, propagation- asexual and sexual and management of plant growth

SECTION-C
Crop environmental factors: air, light, water, temperature, soil; cropping systems and practices; crop pests: weeds and insects; agriculture in 21st century; crop breeding and improvement

SECTION-D
Important field crops of the world: grains, oil, fiber, sugar, drug, forage, biofuel; harvesting, storing and marketing practices

Suggested Readings:
5. Principles of Crop Production, Acquaah.
6. Introduction to Agronomy, Sheaffer & Moncada
7. Plant and Soil Science, R. Parker, Delmar Cengage Learning
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-I)

Crop Science (Practical)

Time: 3 Hours
Max. Marks: 25

Note: Paper will be set on the spot by the examiner

Suggested Exercises:
1. Identification of important crop plants grain, fiber, oil, sugar, drug, forage
2. Identification of important crop-seeds and weeds associated with them.
3. Anatomical sections of stem and roots of common crop species.
4. Techniques of vegetative propagation
5. Technique of emasculation and artificial pollination in important crops
6. Viability and vigour test of seed samples.
7. To record temperature, relative humidity and light intensity values of the atmosphere.
8. To study the community by quadrat method.
10. Determination of specific gravity, bulk density and soil texture.
11. Germination of dormant and non-dormant seeds.

Suggested Readings:
1. Principles of Crop Production, Acquaah.
2. Introduction to Agronomy, Sheaffer & Moncada
3. Plant and Soil Science, R. Parker, Delmar Cengage Learning
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-I)

PAPER-VI : Fundamentals of Biochemistry (Theory)

Time: 3 Hours                      Max. Marks: 75

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

SECTION-A

Biophysics of water: Molecular structure of water, hydrogen
Bond and physical properties of water.
Biomolecules: Structure, function, diversity and distribution, cell wall structure
and general introduction of living matter

SECTION-B

Carbohydrates: Structure of important mono, di, oligo and polysaccharides,
Glycoproteins and Peptidoglycans,
glycolipids and lipopolysaccharides
Proteins: Structure of amino acids, non-protein and rare amino acids and
their chemical reactions. Structural organization of proteins (Primary, Secondary,
Quaternary and domain structure, protein classification and function.
Forces stabilizing Primary, Secondary and Tertiary structure.

SECTION-C

Lipids: Classification of lipids and fatty acids. General structure and function of major lipid
subclasses, acylglycerols, phosphoglycerides, Sphingolipids, glycosphingolipid.

SECTION-D

Nucleic Acids: Structure of nucleosides and nucleic acids, biologically
important nucleotides and
their functions. Different types of DNA & RNA.
Introduce to enzymes: Proteinaceous nature, co-enzymes, isozymes,
ribozymes, classification, active site,
Michalis Menten equation.
Books Recommended:

Fundamentals of Biochemistry (PRACTICAL)

Time: 3 Hours  Max. Marks: 25

1. Preparation of physiological buffers.
2. Verification of Beer Lamberts Law for P-nitrophenol or cobalt chloride.
3. Determination of pKa value of P-nitrophenol
4. Estimation of carbohydrate in given solution by anthrone method.
5. Estimation of sugar in biological samples by dubois method.
6. The determination of acid value of a fat.
7. The saponification value of a fat

Books Recommended:
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-I)

**Industrial Training**

A Two Week Industrial Training is mandatory for completion of the Course. Result would be declared as Satisfactory or Unsatisfactory completion of the Industrial Training Program.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-II)

PAPER–I: COMMUNICATION SKILLS IN ENGLISH-II

Time: 3 Hours

Max. Marks: 50
Theory Marks: 35
Practical Marks: 15

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

Course Contents:

SECTION–A
Listening Skills: Barriers to listening; effective listening skills; feedback skills.
Activities: Listening exercises – Listening to conversation, News and TV reports

SECTION–B
Attending telephone calls; note taking and note making.
Activities: Taking notes on a speech/lecture

SECTION–C
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

SECTION–D
The study of sounds of English, Stress and Intonation, Situation based Conversation in English, Essentials of Spoken English.
Activities: Giving Interviews

PRACTICAL / ORAL TESTING

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 10 minutes duration (Topic can be given in advance or it can be 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.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-II)

Paper-II: पंजाबी (साफ़ामी)

भागः : 3 पृष्ठ
चौंक अंक : 50

कैलेंडर अंक परीक्षामय चट्टी उत्तरीधियाँ

1. पूवें भूवें दे चात जगा देखो। उन जगा विंज़े दे पूवें भूवें तात्को।
2. दिदिक्कमत्वी दे वुड़ पृवें भूवें चात्के उठा। उन जगा विंज़े दि भूवें लगभग तात्को।
3. उलेले पूवें दे वजाव भीं उठा।
4. पेपर मैंट चात्के दाक्ष मेलवत टाँगो उन पूवें ची वड़े भूवें दें दें दें दें चात वह-पूवें विंज़े दि वज़ा उठा तात्को।

पत्र-वून अंक पत्र-पुमुड़वां

मैलम-हें

आउम भूरांभ (जुलिया दागा),
(मंग. सुनिहँद मीठ अठे दिसवाम मिक भंध)
उदन रोज़व रेन फूरस्टिउमैटी, अभिभावक।
(दिल्ली-समुद्र, पूवें हिउरवल)

मैलम-छी

दिदिक्कमत्व जानी (दिदिक्कमत्व वेंड-मंजूरिंड़)
मंग. म.स.असाइस,
पूवें गाइड पूवें मलबास, झुसीइमादा। (सेल्फ 7 उं देव-12)
(मात, लिखव मैली)

मैलम-भी

(देव) महर-वटकव अठे महर उठा : पैडिका, कृपा से मेलबास
(अ) महर वृद्धि

मैलम-जी

(देव) मंगेत उठां
(अ) भूवें विंज़े अठे अखाड
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-II)

Paper-II: ਪਨਾਘਾ (ਇਲਾਵਾ ਦਿਸ਼ਾਧੀਤਾ ਪੰਜਾਬੀ)
(In lieu of Compulsory Punjabi)

ਸਮਾਂ: 3 ਪ੃ਚਕਿਆਂ
ਕੁਲ ਭਾਂਤ: 50

ਖੋਜ-ਚੌਂ
ਮੈਵਾਡਿਆ-ਦੇ

ਸਵਾਦ ਮੁੱਠੀਆਂ: ਪੱਖਾਂ ਅਦਾ ਕਰਦੇ
(ਰੁਦਾ, ਪੱਖਤੱਦ, ਵਿਸਿਸਤ, ਵਿਸਿਸਤਾ, ਵਿਸਿਸਤਾ, ਵਿਸਿਸਤਾ, ਵਿਸਿਸਤਾ, ਮਕੀਨ, ਸੇਸਿਅ ਅਦਾ ਹੰਦੀਆਂ)

ਮੈਵਾਡਿਆ-ਹੁਨ

ਪਨਾਘਾ ਲਾਹ ਘਟੋਂ: ਪੱਖਾਂ ਸ਼ਿਅਦ-ਪੱਖਾਂ
(ਤੇ) ਸਾਧਾਰਣ ਲਾਹ, ਮਾਸਵੱਡ ਲਾਹ ਅਦਾ ਭਾਸਤਰ ਲਾਹ (ਪੱਖਾਂ ਅਦਾ ਕਰਦੇ)
(ਆ) ਵਿਸਿਸਤਾ ਲਾਹ, ਪੱਖਤੱਦਪਰਾ ਲਾਹ ਅਦਾ ਵਾਸ਼ੀ ਲਾਹ (ਪੱਖਾਂ ਅਦਾ ਕਰਦੇ)

ਮੈਵਾਡਿਆ-ਸੌਂ

ਪ੍ਰਭੂ ਉਦਰਦਾ
ਸੇਸਿਅ ਉਦਰਦਾ

ਮੈਵਾਡਿਆ-ਤੁਰ

ਗਿਨਾ ਪੈਂਦਾ (ਪੱਖਤੱਦ ਅਦਾ ਰੋਟੀ)
ਅਲਾਗ ਅਦਾ ਮੁੱਠੀਆਂ
BACHELOR OF VOCATION (B.Voc.)  
(AGRI FOOD SCIENCE) (SEMESTER-II)  

Paper-II: Punjab History & Culture (C 320 to 1000 B.C.)  
(Special Paper in lieu of Punjabi compulsory)  
(For those students who are not domicile of Punjab)  

Time: 3 Hours  
Max. Marks : 50  

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

Section A  
1. Alexander’s Invasion and its Impact  
2. Punjab under Chandragupta Maurya and Ashoka.  

Section B  
3. The Kushans and their Contribution to the Punjab.  
4. The Panjab under the Gupta Empire.  

Section C  
5. The Punjab under the Vardhana Emperors  
6. Socio-cultural History of Punjab from 7th to 1000 A.D.  

Section D  
7. Development of languages and Education with Special reference to Taxila  
8. Development of Art & Architecture  

Suggested Readings  
1. L. M Joshi (ed), History and Culture of the Punjab, Art-I, Punjabi University, Patiala, 1989 (3rd edition)  
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-II)

Paper-III: Drug Abuse: Problem, Management and Prevention
(COMPULSORY PAPER)

DRUG ABUSE: MANAGEMENT AND PREVENTION

Time: 3 Hours Max. Marks: 50

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

Section – A
Prevention of Drug abuse:
Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.

Section – B
School: Counselling, Teacher as role-model. Parent-teacher-Health Professional Coordination, Random testing on students.

Section – C
Controlling Drug Abuse:
Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program

Section – D

References:
1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-II)

PAPER-IV : Fundamentals of Genetics (Theory)

Time: 3 Hours Max. Marks: 75

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

SECTION–A
Organization of Chromosomes: Genome size and complexity, the supercoiling of DNA, euchromatin and heterochromatin, satellite DNA. The structure of prokaryotic and eukaryotic chromosomes, Polytene and Lamp-Brush chromosomes.

SECTION–B
Mendel’s Laws of Inheritance: Principle of segregation and Independent assortment, Monohybrid, dihybrid and trihybrid crosses, Back cross and test cross.

Interaction of Genes: Incomplete inheritance and co-dominance, pleotropism, modification of F2 ratios: epistasis, complementary genes, supplementary genes, inhibitory genes, duplicate genes, lethality and collaborators genes. Multiple allelism.

SECTION–C
Linkage: Coupling and repulsion hypothesis, chromosomal theory of linkage, complete and incomplete linkage, linkage groups and significance of linkage. Tetrad analysis in fungi.

Crossing Over: Introduction, molecular mechanism of meiotic crossing over, types of crossing over, factors affecting it and its significance.

SECTION–D
Mutation: Spontaneous versus induced mutations, types of mutations, mutations rate and frequency, Mutagens: Physical and Chemical, the molecular basis of mutations. Significance & Practical applications of Mutation

Basic Microbial Genetics: Conjugation, transduction, transformation
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-II)

Fundamentals of Genetics (Practical)

Time: 3 Hours  
Max. Marks: 25

Note: Paper will be set on the spot by the examiner

Suggested Exercises:
1. Demonstration of Law of segregation and Independent assortment (use of coloured beads, capsules etc.).
2. Numerical problems on Mendelism and on modified F2 ratios.
5. Study of polytene chromosomes from permanent slides.
6. Dermatographics : Palm print taking and finger tip patterns.
7. Preparation and study of mitosis slides from onion root tips by squash method.

Suggested Readings:
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-II)

PAPER-V : Food Processing (Theory)

Time: 3 Hours

Max. Marks: 75

Instructions for the Paper Setters:

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

SECTION–A
Introduction, sources of food, scope and benefit of industrial food preservation, perishable and non-perishable food, causes of food spoilage. Deteriorative factors of foods, Unit operations in food industry, quality factors of foods Principle and methods of Preservation by salt and sugar and chemicals

SECTION–B
Thermal processing methods of preservation – blanching, pasteurization, sterilization and canning Food dehydration and evaporation -Principle, Methods, equipments used.

SECTION–C
Cold preservation and processing– cold storage, refrigeration and freezing . Fermentation as food preservation – methods and products.

SECTION–D
Definition and methods of food irradiation, direct and indirect effect, measurement of radiation dose, effect on microorganisms and quality of foods. Microwave heating and applications in foods, Recent methods in preservation: Pulsed electric field processing, High pressure processing, Processing using ultrasound, dielectric, Ohmic and infrared heating.

Recommended Books:
1. Food Processing and Preservation- Subbulaksmi G., and Udipi S.
4. Food Science- Potter, CBS publishers.
5. Technology of Food Preservation - N.W. Desroiser and N.W. Desroiser
6. Introduction to Food Science & Technology- G.P. Stewart & M.A. Amerine
Food Processing (Practical)

Time: 3 Hours

Max. Marks: 25

Note: Paper will be set on the spot by the examiner

1. Demonstration of various machineries used in food processing.
2. Demonstration on effect of blanching on quality of foods.
3. Demonstration on canning and bottling of fruits and vegetables.
4. Preservation of food by concentration method
5. Preservation of food by using chemicals.
6. Drying of foods in tray drier
7. Osmotic dehydration of foods.
8. Preservation of milk by concentration.
9. Demonstration of preserving foods under low temperature.
11. Cut out analysis of canned product.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-II)

PAPER-VI : Crop Physiology (Theory)

Time: 3 Hours  
Max. Marks: 75

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

SECTION–A


SECTION–B


SECTION–C

Photosynthesis: Significance, historical aspects, photosynthetic pigments, action and absorption spectra and enhancement effects, concept of two photosystems, z-scheme, photophosphorylation, Calvin, cycle, C4 pathway, CAM plants, photorespiration, factors affecting photosynthesis.

Respiration: Glycolysis, TCA, electron transport mechanism (chemi-osmotic theory) and Pentose Phosphate Pathway, oxidative phosphorylation, respiratory quotient and energy budgeting in respiration

SECTION–D

Growth and Development: Definitions, phases of growth and development, kinetics of growth, seed dormancy, seed germination and factors of their regulation, plant movements, the concept of photoperiodism, physiology of flowering, vernalization-devernalization, physiology of senescence, abscission, fruit ripening, plant hormones - auxins, gibberellins, cytokinins, abscissic acid and ethylene, history of their discovery, biosynthesis, mechanism of action and their practical application in crop productivity.
Suggested Readings:

BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-II)

Crop Physiology (Practical)  
Max. Marks: 25

Time: 3 Hours

Note: Paper will be set on the spot by the examiner

Suggested Laboratory Exercises:
1. To study the permeability of plasma membrane using different concentrations of organic solvents.
2. To study the effects of temperature on permeability of plasma membrane.
3. To prepare the standard curve of protein and determine the protein content in unknown samples.
5. Determining the osmotic potential of vacuolar sap by plasmolytic method.
6. Determining the water potential of any tuber.
7. Bioassay of auxin, cytokinin, GA, ABA and ethylene using appropriate plant material.
8. Demonstrate the ascent of sap using a dye.
9. Demonstrate the transpiration pull by mercury method.
10. Demonstration of osmosis by potato osmoscope.
11. Comparison of loss of water from two surfaces of leaf by CoCl₂ method/four leaf method.
12. Demonstration of imbibition by plaster of peris method.
13. Demonstration that O₂ is evolved during photosynthesis.
15. Demonstration of phototropism movements.
16. Demonstration the measurements of growth by arc auxanometer.

Suggested Readings (For Laboratory Exercises)
Industrial Training

A Two Week Industrial Training is mandatory for completion of the Course. Result would be declared as Satisfactory or Unsatisfactory completion of the Industrial Training Program.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-III)

PAPER-I : Basics of Computers
(Theory) Max. Marks: 50

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

SECTION-A
FUNDAMENTAL OF COMPUTER : Introduction to computer, Applications of computer. Components of computer. Primary and Secondary storage. Number systems.

SECTION-B
INTRODUCTION TO WINDOWS : Parts of window screen (Desktop, Window, Icons), Start menu, Taskbar, settings, application & document window, anatomy of a window (Title bar, minimize, maximize button, control box, scroll bars, scroll buttons, scroll boxes), Window explorer (expansion, collapsing of directory free, copying, moving, deleting files, folder, creating folders), About desktop icons (recycle bin, my computer, network neighborhood, briefcase ), folder, shortcut creation, setting of screen saver, color settings , wallpaper, changing window appearance.

SECTION-C
MS-WORD : Introduction to MS-word, Parts of window of word (Title bar, menu bar, status bar, ruler),Creation of new document, opening document, insert a document into another document. Page setup, margins, gutters, font properties, Alignment, page breaks, header, footer, deleting, moving replace, a filing text in document. Saving a document, spell checker, printing a document, creating a table, entering editing text in tables, changing format of table, height width of row or column Editing, deleting, rows, Columns in table. Borders, shading, Templates, Wizards Drawing objects, mail merge.

SECTION-D
MS-POWER POINT : Introduction, elements of Power Point Package, starting Power Point, Exploring Power Point menus, starting a new slide, Adding Titles, Text and Art, Moving text area and resizing text box starting a slide show, saving a presentation, printing slides, opening an existing presentation, Inserting and deleting slides in a presentation, changing text and correcting error, checking spelling, adding header and footer, closing a presentation, To quit from Power Point views, slide setup, setting up slide show, setting transistors and slide timings, Automatic slide show, Formatting and Enhancing text, Slide with graph.

Book Recommended:
PC Software by Rachhpal Singh & Gurinder Singh.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-III)

PAPER-I : Basics of Computers
(Practical)

Max. Marks: 30

Instructions for the Paper Setters: Question Paper will be set with the mutual consent of Internal and External Examiners at the spot.

WINDOW-95:
1. Change the Background of the Desktop and also set the screen saver.
2. Create a Folder RAMAN and also create a Folder MOHAN with in the RAMAN folder.
3. Create a short cut of MS-Word on the desktop.
4. Delete some files from the MOHAN folder and also recall these files from the Recycle Bin. Empty the remaining recycle bin.
5. Copy some files from the C drive to floppy drive A using the Windows Explorer facility.

MS-WORD:
1. Create a document files, save it and print it.
2. Spell check the created document file.
3. Create a Table and sort the data within the table.
4. Mail Merge a invitation to your friends.
5. Apply border to a particular paragraph and shade it 10% with Background yellow colour.

MS-POWER POINT:
1. Create a presentation, save it and print it.
2. Format a presentation with changing the fonts and size and selecting text style and colours.
3. Create a graph ; add titles, axes and legends to a graph.
4. Add a Clipart picture to a chart.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-III)

PAPER-II : ANALYTICAL TECHNIQUES
(Theory)

Time: 3 Hrs.                                      Max. Marks: 50

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

SECTION-A
Brief introduction and principles: Spectroscopic techniques using UV/Visible, polarimetry, refractometry, microscopic techniques in food analysis (light microscopy).

SECTION-B
Electron microscopy: principle and brief introduction to types of electron microscopy (SEM, TEM): application of electron microscopy in food processing

SECTION-C
Principle and working of Column chromatography, Gas chromatography and High Pressure Liquid Chromatography. Brief introduction and principles to Separation techniques: ultrafiltration and supercritical fluid extraction.

SECTION-D
Brief introduction and principles to Special techniques: surface tension; thermal methods in food analysis (Differential scanning colorimetry). Texture analyzer, rheometer, hunterlab, amylograph and farinograph, calorimeter.

Recommended Books:

BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-III)

PAPER-II : ANALYTICAL TECHNIQUES
(Practical)

Marks: 30

Instructions for the Paper Setters: Question Paper will be set with the mutual consent of Internal and External Examiners at the spot.

1. Sorption isotherms by measuring water activity in any hygroscopic food material (for instance - biscuits/potato chips/coffee powder).
2. Estimation of tannin/phytic acid/ pigments by spectrometric method.
3. Estimation of calorific values using calorimeter
4. Separation of amino acids/coal tar dyes by two dimensional paper chromatography.
5. Separation and identification of carotenoids by column chromatography.
6. Analysis of dietary fibre/glucose by enzymatic method.
7. Demonstration of instruments: GLC, HPLC, Atomic absorption, Flame photometer, Farinograph, UV-Vis spectrophotometer and microscopes.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-III)

PAPER-III : Crop Production
(Theory)

Time: 3 Hours  Max. Marks: 50

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

SECTION-A
Introduction to agriculture and crops production, history of agriculture, overview of crop production in India with special reference to Punjab, agro-ecological zones in India.

SECTION-B
Factors affecting crop growth and production; genetic and environmental factors, crop management through environmental modification and adaptation of crops to the existing environment through crop cultural practices.

SECTION-C
Regional and seasonal selection of crops; kharif, rabi and zaid crops; their cultivation practices and management, precision agriculture, field preparations of crops including tillage, selection and treatment of seeds and nursery growing.

SECTION-D
Crop water and nutrition management- need for supplementation of nutrients to soil, methods and timing of application including fertigation schedule, crop protection including weed management, pests and pathogens, methods of crop harvest, crop production field to market.

Books recommended
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-III)

PAPER-III : Crop Production
(Practical)

Time: 3 Hours                              Max. Marks: 30

Instructions for the Paper Setter-Question Paper will be set with the mutual consent of Internal and External Examiners at the spot.

1. Identification of major cereal and vegetable crops.
2. Determination of soil bulk density and porosity.
3. Determination of soil pH and temperature.
4. Methods of application of herbicides in different field crops.
5. Judging of physiological maturity in different crops and working out harvest index.
6. Working out cost of cultivation of different crops
7. Installation of drip irrigation systems in fields.
9. Study of seed production techniques in various crops
10. Identification of important weeds of different crops
11. Visit to nearby villages for identification of constraints in crop production

Books recommended:
2. Agronomy of field crop by S.R. Reddy
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-III)

PAPER-IV : INTRODUCTORY MICROBIOLOGY
(Theory)

Time: 3 Hrs. Max. Marks: 50

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

SECTION-A

SECTION-B
General characteristics and Nutritional requirements: General characteristics of bacteria, yeast, mold, viruses, algae. Types of bacteria, Nutritional classification of bacteria.
Reproduction of micro-organisms: Brief account of bacteria, yeast and mold reproduction.

SECTION-C
Microbial Growth : Definition of growth, growth cycle, growth rate, generation time, measurement of growth, effect of environmental factors such as temperature, oxygen, moisture, salt, pH, oxidation- reduction potential and radiations on growth.

SECTION-D
Control of Micro organisms: Control of micro organisms by physical, chemical and other chemotherapeutic agents.

Books Recommended:
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-III)

PAPER-IV : INTRODUCTORY MICROBIOLOGY
(Practical)

Marks: 30

Instructions for the Paper Setters: Question Paper will be set with the mutual consent of Internal and External Examiners at the spot.

1. To study different parts of a microscope.
2. Study of instruments (Autoclave, Hot air oven, Incubator, Laminar flow, pH meter, and spectrophotometer) of microbiology laboratory.
3. Preparation of nutrient agar and MacConkey’s Agar plates, slants and broth.
4. To study the serial dilution method.
5. To perform pour plate, spread plate and streak plate methods for isolation and enumeration of micro-organisms.
6. To demonstrate acid fast staining.
7. To stain the given bacteria by Gram’s staining method.
8. To measure the size of given micro-organisms by ocular and stage micrometer.
9. To determine the number of micro-organisms with a Haemocytometer.
10. To determine the motility of bacteria by hanging drop method.

Books Recommended:
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-III)

PAPER-V : FOOD BIOTECHNOLOGY
(Theory)

Time: 3 Hrs.                      Max. Marks: 50

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

SECTION-A
Introduction: Components of Molecular Biotechnology, Recombinant DNA Technology,
Restriction Endonucleases, Cloning Vectors, Polymerase Chain Reaction

SECTION-B
Applications of Food Biotechnology: Plant Biotechnology for Food Production, Improvement
of Plant Nutritional and Functional Quality, Plant Proteins, Lipids, Saturated Fatty Acids,
Unsaturated Fatty Acids, Carbohydrates, Plant Vaccines, Milk Proteins

SECTION-C
Reconstitution of Human Milk Proteins in Food Plants, Carotenoids, Vitamins, Minerals,
Manipulation of Fruit Ripening,

SECTION-D
Genetically modified crops for food production, Future trend of GM crops, Food ingredients,
processing aids, dietary supplements derived from GM microorganisms, Risk of GMOs and GM
Foods to Human Health and Environment

RECOMMENDED BOOKS:

1. Lopez G.F.G and Canovas G.V.B. Food Science and Food biotechnology CRC press
2. Fundamentals of Food Biotechnology by Byong H. Lee: Wiley VCH
3. Tripathy S. N. Food Biotechnology Dominanat Publishlers and distributors ND
4. Singh R.P. Biotechnology Central Book depot Allahabad
1. Isolation of DNA from micro-organisms.
2. Isolation of DNA from fruits and vegetables.
3. Colorimetric estimation of DNA.
4. Colorimetric estimation of RNA.
5. Demonstration of PCR.
6. Demonstration of tissue culturing in Lab.
7. Digestion of DNA by Restriction Endonucleases.
8. Making & Selection of competent E. coli.
9. Demonstration of ELISA.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

PAPER-I : ESL-221 : Environmental Studies (Compulsory Paper)

Time: 3 Hrs.  Max. Marks: 100

Teaching Methodologies
The Core Module Syllabus for Environmental Studies includes class room teaching and field work. The syllabus is divided into 8 Units [Unit-I to Unit-VII] covering 45 lectures + 5 hours for field work [Unit-VIII]. The first 7 Units will cover 45 lectures which are class room based to enhance knowledge skills and attitude to environment. Unit-VIII comprises of 5 hours field work to be submitted by each candidate to the Teacher in-charge for evaluation latest by 15 December, 2018.

Exam Pattern:
End Semester Examination- 75 marks
Project Report/Field Study- 25 marks [based on submitted report]
Total Marks- 100

The structure of the question paper being:

Part-A, Short answer pattern with inbuilt choice – 25 marks
Attempt any five questions out of seven distributed equally from Unit-I to Unit-VII. Each question carries 5 marks. Answer to each question should not exceed 2 pages.

Part-B, Essay type with inbuilt choice – 50 marks
Attempt any five questions out of eight distributed equally from Unit-I to Unit-VII. Each question carries 10 marks. Answer to each question should not exceed 5 pages.

Project Report / Internal Assessment:

Part-C, Field work – 25 marks [Field work equal to 5 lecture hours]
The candidate will submit a hand written field work report showing photographs, sketches, observations, perspective of any topic related to Environment or Ecosystem. The exhaustive list for project report/area of study are given just for reference:

1. Visit to a local area to document environmental assets: River / Forest/ Grassland / Hill / Mountain / Water body / Pond / Lake / Solid Waste Disposal / Water Treatment Plant / Wastewater Treatment Facility etc.
2. Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
3. Study of common plants, insects, birds
4. Study of tree in your areas with their botanical names and soil types
5. Study of birds and their nesting habits
6. Study of local pond in terms of wastewater inflow and water quality
7. Study of industrial units in your area. Name of industry, type of industry, Size (Large, Medium or small scale)
8. Study of common disease in the village and basic data from community health centre
9. Adopt any five young plants and photograph its growth
10. Analyze the Total dissolved solids of ground water samples in your area.
11. Study of Particulate Matter (PM_{2.5} or PM_{10}) data from Sameer website. Download from Play store.
12. Perspective on any field on Environmental Studies with secondary data taken from Central Pollution Control Board, State Pollution Control Board, State Science & Technology Council etc.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

Unit-I
The multidisciplinary nature of environmental studies
Definition, scope and importance, Need for public awareness

(2 lectures)

Unit-II
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 forests 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 non-renewable 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.

(8 Lectures)

Unit-III
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: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

(6 Lectures)

Unit-IV
Biodiversity and its conservation
- Introduction – Definition: genetic, species and ecosystem diversity
- 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-spots 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

(8 Lectures)
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

Unit-V

Environmental Pollution
Definition
- Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides

(8 Lectures)

Unit-VI

Social Issues and the Environment
- From unsustainable to sustainable development
- Urban problems and related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environmental Protection Act, 1986
- Air (Prevention and Control of Pollution) Act, 1981
- Water (Prevention and control of Pollution) Act, 1974
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

(7 Lectures)

Unit-VII

Human Population and the Environment
- Population growth, variation among nations
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights
- Value Education
- HIV / AIDS
- Women and Child Welfare
- Role of Information Technology in Environment and Human Health
- Case Studies

(6 Lectures)
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

Unit-VIII

Field Work
- Visit to a local area to document environmental assets
  river/forest/grassland/hill/mountain
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems-pond, river, hill slopes, etc

(Field work equal to 5 lecture hours)

References:
2. Down to Earth, Centre for Science and Environment, New Delhi.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

PAPER-II : Environment Impact Assessment (Theory)

Time: 3 Hours                   Max. Marks: 100

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

SECTION-A
Sustainable development- need for Environmental Impact Assessment (EIA), Environmental Impact Statement (EIS) and EIA capability and limitations, legal provisions on EIA, Stages of EIA, types of EIA.

SECTION-B
Methods of EIA, check lists, matrices, networks, cost-benefit analysis, analysis of alternatives.

SECTION-C
Assessment of impact on land, water, air, social & cultural activities and on flora & fauna, mathematical models, public participation.

SECTION-D
Plan for mitigation of adverse impact on environment, options for mitigation of impact on water, air, land and on flora & fauna, case studies related to EIA, addressing the issues related to the project affected people. Post project monitoring,

Books recommended:
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

PAPER-II : Plant Pathology and Crop Disease Management (Theory)

Time: 3 Hours                      Max. Marks: 75

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

SECTION-A
Introduction; definitions and concepts of plant diseases, history and growth of plant pathology, economic importance, nature and causes (biotic and abiotic) of diseases, disease development and disease cycle, general principles of control.

SECTION-B
General account of viruses and mycoplasma, Bacteria: structure, nutrition, economic importance and common diseases related to viruses and bacteria: Yellow Vein Mosaic of Bhindi, Citrus canker, TMV of Potato

Fungi: general characters, classification of fungi and life histories of following members in related to plant diseases; Albugo, Phytophthora, Puccinia, Cercospora, Colletotrichum and Ustilago

SECTION-C
Nematodes: general morphology, classification, symptoms and nature of damage caused by plant nematodes.

Introduction, history, importance and types of plant disease epidemics, factors influencing dynamics of epidemics, monitoring of plant disease epidemics and forecasting.

SECTION-D
Principles and methods of plant disease management based on exclusion, avoidance, eradication, protection (preventive and curative) and resistance, management of plant diseases- regulatory, cultural, biological, physical and chemical strategies, integrated disease management (including judicious use of chemicals in plant disease management), seed health certification system.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

Books Recommended


BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

PAPER-II : Plant Pathology and Crop Disease Management (Practical)

Time: 3 Hours
Max. Marks: 25

Suggested Exercises:

1. Acquaintance with microscope and other lab equipments.
2. Various techniques of sterilization and preparation of media.
3. General study of different plant disease caused by viruses, bacteria, fungi and nematodes.
4. Enumeration of microbial population in soil- bacteria, fungi and actinomycetes.
5. Extractions of nematodes from soil.
7. Study of fungicides and their formulations.

Books Recommended-

BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

PAPER-III : Food Legislation and Quality System (Theory)

TIME: 3 HR
MAX. MARKS : 75

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

SECTION-A
Objectives, importance and functions of quality control. Methods of quality assessment of food materials fruits, vegetables, cereals, dairy products, meat, egg and processed products.

SECTION-B
Sampling, specifications of raw materials and finished products. Sensory evaluation.
SQC and control chart technique: concept of ISO 9000.

SECTION-C
Quality Attributes: Size, Shape, Colour, Aroma, Texture.

SECTION-D
Basic concept, HACCP, TACCP, ISO series, TQM - concept and need for quality, structure of risk Analysis. Implementation of food safety programme, testing for food safety and performance standards. Food safety laws and regulations (FSSAI). New approaches to food safety, food labelling and nutrition labelling. Food traceability.

Recommended Books:

BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

PAPER-III : Food Legislation and Quality System
(Practical)

Instructions for the Paper Setters: Question Paper will be set with the mutual consent of Internal and External Examiners at the spot.

2. Quality evaluation of cereals.
3. Quality evaluation of fruits and vegetables.
6. Adulterants in milk, cereals, oils & fats and their detection.
In the given document, the section contains instructions for paper setters, covering various aspects of food plant layout and sanitation. The text is structured into four sections, each focusing on different aspects of plant design and sanitation. The recommended books section provides a list of resources for further study in the field.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

PAPER-IV : FOOD PLANT LAYOUT AND SANITATION
(Practical)

Marks: 25

Instructions for the Paper Setters: Question Paper will be set with the mutual consent of Internal and External Examiners at the spot.

• Calculation of depreciation of machinery and processing costs.
• Preparation of layout and process diagram of potato crisp manufacturing plant.
• Preparation of layout and process diagram of Jam/Marmalade manufacturing plant.
• Preparation of layout and process diagram of Bread making plant.
• Preparation of layout and process diagram of a dairy industry.
• Preparation of layout and process diagram of wine making unit.
• Preparation of layout and process diagram of a modern slaughter house.
• Preparation of layout and process of diagram of a confectionary unit.
BACHELOR OF VOCATION (B.Voc.)
(AGRI FOOD SCIENCE) (SEMESTER-IV)

PAPER-V : INDUSTRIAL TRAINING

Report Assessment : (Satisfactory / Unsatisfactory)

The student will submit a report after Industrial Training. The report will be evaluated as Satisfactory / Unsatisfactory.