

**SYLLABUS: Course outline**

**B.Sc. Agriculture**

**Batch 2014 onwards**



**Punjab Technical University**

## Semester Second

Hrs. : 24

Course Code	Course Title	Load Allocation			Marks Distribution		Total	Credits		
		L	T	P	Internal	External				
BSAG-201	Elementary Microbiology	3	-	-	40	60	100	3		
BSAG-202	Principles of Economics	3	-	-	40	60	100	3		
BSAG-203	Water Management and Micro Irrigation	3	-	-	40	60	100	3		
BSAG-204	Vegetable Production Technology	3	-	-	40	60	100	3		
BSAG-205a	Mathematics-II *	3	-	-	40	60	100	3		
BSAG-205b	Biology -II**	3	-	-	40	60	100	3		
BSAG-206	Computer Applications in Agriculture	2	-	-	20	30	50	2		
BSAG-207a	Punjabi #	2	-	-	20	30	50	2		
BSAG-207b	Basic Punjabi ##	2	-	-	20	30	50	2		
BSAG-208	Elementary Microbiology (Practical)	-	-	2	20	30	50	1		
BSAG-209	Water Management and Micro Irrigation (Practical)	-	-	2	20	30	50	1		
BSAG-210	Vegetable Production Technology (Practical)	-	-	2	20	30	50	1		
BSAG-211	Biology II (Practical)			2	20	30	50	1		
BSAG-212	Computer Applications in Agriculture (Practical)	-	-	2	20	30	50	1		
TOTAL							340	510	850	24

- \*Practical will consist of two hours means two hour session of practical
- \*Optional subject for students who had studied Medical in 10+2
- \*\* Optional subject for students who had studied Non-Medical in 10+2
- # For students who had studied Punjabi at matriculation level and these students are exempted from BSAG 207b course
- ## For students who had not studied Punjabi at matriculation level and these students are exempted from BSAG 207a course

**BSAG-201: Elementary Microbiology**

**Credit: 3**

**SECTION - A**

History of Microbiology - Its applied areas. Discovery of microorganisms and their role in fermentation. Germ theory of disease and mechanisms of protection against them. Structure of eukaryotic and prokaryotic cell. Major groups of eukaryotes - fungi, algae and protozoa.

**SECTION - B**

Major groups of prokaryotes - actinomycetes, cyanobacteria, arhaebacteria, rickettsias and chlamydia. Bacterial growth. Metabolism in bacteria - ATP generation. chemoautotrophy, photoautotrophy, respiration, fermentation. Bacteriophages - structure and properties, lytic and lysogenic cycles, virioids, prions. Genetic recombinations. Microbial groups in soil.

**SECTION - C**

Microbial transformation of carbon, nitrogen, phosphorus and sulphur. Biological nitrogen fixation. Microbes in composting. Microbiology of water and food. Beneficial microorganisms in agriculture - biofertilizers, microbial pesticides.

**SECTION - D**

Biodegradation. Biogas production. Plant-microbe interactions. Introduction to mushrooms and mushroom growing. Edible and poisonous mushrooms. Cultivation technology of mushrooms.

**BOOKS RECOMMENDED**

1. Microbiology by H.J. Pleczar
2. Introductory Microbiology by J. Heritage
3. Essentials of Microbiology by K.S. Bilgrami

## **BSAG 202: Principles of Economics**

**Credit: 3**

### **SECTION - A**

Economics- Meaning, definition, subject matter, basic concepts- Want, utility, satisfaction, income, wealth, welfare etc; Theory of consumption- marginal utility analysis; Indifference curves; Consumer's surplus

### **SECTION - B**

Demand- Meaning, definition, kinds of demand, law of demand, change in demand. Elasticity of demand types, degrees, methods of measurement, importance and factors influencing elasticity of demand; Supply, elasticity of supply, factors affecting supply

### **SECTION -C**

Definition and characteristics of Perfect competition, pure competition, monopolistic competition, oligopoly and monopoly; price determination under these market situations; Marginal productivity theory of distribution

### **SECTION - D**

National Income- concepts, measurement, meaning, definition, and importance; Classical and Keynesian approaches, effective demand, multiplier, accelerator. National income- Concepts and Measurement; Inflation - Meaning, definition, kinds of inflation

### **BOOKS RECOMMENDED**

□ Principles of Economics by M.C. Vaish and K.P.M. Sundharam □

Economic theory by K.K. Dewitt

□ The Theory of Price by G.J. Stiggler

**BSAG 203: Water Management and Micro Irrigation**

**Credit: 3**

**SECTION - A**

Irrigation- Definition and objectives; Water resources and overtime irrigation development in India and Punjab

**SECTION - B**

Plant water relationships; water requirement major crops and the methods of determination of water requirements; Effective rainfall, Mulching and criteria of scheduling irrigation

**SECTION - C**

Methods of irrigation- surface, sprinkler and drip irrigation; Irrigation efficiency measures; Conjunctive use of water; Agricultural drainage

**SECTION -D**

Water management in rice, wheat, maize, cotton, groundnut, moongbean, sugarcane, mustard, kinnow, mango and main vegetable crops- potato, tomato and okra

**BOOKS RECOMMENDED**

- Handbook of Agricultural Sciences by S.P. Singh

Irrigation Methods by Israelson

- Irrigation Engineering by V.V. Murthy
- Soil Physics by Ghildyal & Tripathy

**BSAG 204: Vegetable Production Technology**

**Credit: 3**

**SECTION - A**

Importance of olericulture; Vegetable gardens; Origin of Vegetables, classification, area, yield and production and varieties of important vegetable gardens

**SECTION - B**

Package of practices of tomato, brinjal, chillies, okra, Cucurbitaceous vegetables-- cucumber, ridge gourd, ash gourd, snake gourd, bottle gourd, bitter gourd and melons

**SECTION - C**

Package of practices of Cole crops - cabbage, cauliflower, broccoli and knol-khol; Bulb crops - onion and garlic; Beans and peas - French beans, cluster beans, dolichos beans, peas and cowpea

**SECTION -D**

Package of practices of Tuber crops - potato, sweet potato, tapioca, colocasia; Root crops - carrot, radish, turnip and beet root; Leafy vegetables - palak, methi, and lettuce

**BOOKS RECOMMENDED**

- Package of practices of vegetable crops, PAU, Ludhiana

Handbook of Agriculture, ICAR New Delhi

- Handbook of Agricultural Sciences by S.P. Singh
- Vegetable by MS Dhaliwal

**BSAG 205a: Mathematics-II**

**Credit: 3**

**SECTION - A**

Definition of function; Limit and continuity; The Limit of a Function, Calculating Limits Using the Limit Laws, Limits at Infinity; Horizontal Asymptotes' Derivatives and Rates of Change; The Derivative of a Function

**SECTION -B**

Differentiation, successive differentiation, geometrical interpretation of derivative, applications of differentiation

**SECTION -C**

Indefinite integration, integration by substitution

**SECTION -D**

Partial fractions and their use in integration; Integration by parts

**BOOKS RECOMMENDED**

- Differential and Integral Calculus, Vol. II by N. Piskunov
- Differential and Integral Calculus - Vol. 1 by GKP

**BSAG 205b: Biology-II**

**Credit: 3**

**SECTION - A**

Cell structure; cell division; bio-molecules; Simple and compound tissues

**SECTION - B**

Functional organization of various systems of a mammal, preferably ruminant; Gametogenesis and development of frog up to three germinal layers

**SECTION -C**

Taxonomy and Systematics; Binomial nomenclature, classification and general survey of animal kingdom

**SECTION -D**

Common ectoparasites and endoparasites of man and domestic animals

**BOOKS RECOMMENDED**

- Handbook of Agriculture, ICAR New Delhi
- Handbook of Agricultural Sciences by S.P. Singh



## **BSAG-206 Computer Application in Agriculture**

**Credit: 2**

### **Section A**

Introduction, characteristics of a computers; evolution and classification of computer; limitations of computer; application of computer in agriculture and related fields; computer hardware and software; Input and output devices; memory and storage devices, typical specifications of a computer

### **Section B**

Operating System; types and functions; classification of programming languages; language translators; computer viruses

### **Section C**

Microsoft windows; Microsoft world; power points; spreadsheet applications in agriculture, database application in agriculture; expert systems in agriculture, analysis and forecasting with examples

### **Section D**

Internet- World Wide Web (WWW); web browsing and electronic mail; blue tooth

### **BOOKS RECOMMENDED**

- Fundamentals of Computers by PK Sinha
- Fundamentals of Computers by V. Rajaraman

Information Technology by Satish Jain

**BSAG-207a Punjabi**

**Credit: 2**

1. ਲੇਖ : ਪਹੀਆ ਪ੍ਰਦੂਸ਼ਣ, ਭਰੂਣ ਹੱਤਿਆ ਦੇ ਦੇਸ਼ ਵਿਚ, ਨਾਰੀ ਸ਼ਕਤੀ, ਵਾਤਾਵਰਣੀ ਪ੍ਰਦੂਸ਼ਣ ਅਤੇ ਮਨੁੱਖ, ਏਡਜ਼ : ਇਕ ਗੰਭੀਰ ਸੰਕਟ।
2. ਲੇਖ : ਕੇ. ਐਲ. ਸਹਿਗਲ, ਬੜੇ ਗੁਲਾਮ ਅਲੀ ਖਾਂ, ਸੋਭਾ ਸਿੰਘ, ਪ੍ਰਿਥਵੀ ਰਾਜ ਕਪੂਰ, ਭਾਈ ਸਮੁੰਦ ਸਿੰਘ
3. ਪੈਰਾ ਰਚਨਾ
4. ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪਸ਼ਨਾ ਦੇ ਉਤਰ।
5. (ੳ) ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਓਂਤ : ਓਚਾਰਨ ਅੰਗ, ਓਚਾਰਨ ਸਥਾਨ ਤੇ ਵਿਧੀਆਂ, ਸਵਰ, ਵਿਅੰਜਨ, ਸੁਰ।  
(ਅ) ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ- ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪ ਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ।

**BOOKS RECOMMENDED**

- ਗਿਆਨ ਮਾਲਾ (ਵਿਗਿਆਨਕ ਤੇ ਸਮਾਜ-ਵਿਗਿਆਨਕ ਲੇਖਾ ਦਾ ਸੰਗ੍ਰਹਿ), ਸੰਪਾ. ਡਾ. ਸਤਿੰਦਰ ਸਿੰਘ, ਪ੍ਰ. ਮਹਿੰਦਰ ਸਿੰਘ ਬਨਵੰਤ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
  - ਪੰਜਾਬ ਦੇ ਮਹਾਨ ਕਲਾਕਾਰ (ਬਲਵੰਤ ਗਾਰਗੀ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ। □
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਗਿਆਨ, ਡਾ. ਸੁਖਵਿੰਦਰ ਸਿੰਘ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ

**BSAG-207b Basic Punjabi**

**Credit: 2**

1. ਪੰਜਾਬੀ ਭਾਸ਼ਾ : ਨਾਮਕਰਣ ਅਤੇ ਸੰਖੇਪ ਜਾਣ ਪਛਾਣ, ਗੁਰਮੁੱਖੀ ਲਿਪੀ : ਨਾਮਕਰਣ, ਗੁਰਮੁੱਖੀ ਵਰਣਮਾਲਾ, ਪੈਂਤੀ ਅੱਖਰੀ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ਓ ਅ ਏ), ਲਗਾਂ ਮਾਤਰਾ, ਪੈਰ ਵਿੱਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ, ਪੈਰ ਵਿੱਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ।
2. ਗੁਰਮੁੱਖੀ ਆਰਥੋਗ੍ਰਾਫੀ ਅਤੇ ਉਚਾਰਨ : ਸਵਰਾਂ ਦੀ ਵੰਡ ਅਤੇ ਉਚਾਰਨ (ਲਘੂ-ਦੀਰਘ ਸੂਰ) : ਸੂਰ ਅਤੇ ਲਗਾਂ ਮਾਤਰਾ : ਵਿਅੰਜਨਾਂ ਦੀ ਵੰਡ ਅਤੇ ਉਚਾਰਨ : ਪੈਰ ਵਿੱਚ ਪੈਣ ਵਾਲੇ ਵਰਣਾਂ (ਹ, ਰ, ਵ) ਦਾ ਉਚਾਰਨ : ਲ ਅਤੇ ਲ ਦਾ ਉਚਾਰਨ : ਭ, ਧ, ਢ, ਝ, ਞ ਦਾ ਉਚਾਰਨ; ਪੈਰ ਵਿੱਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣਾਂ ਦਾ ਉਚਾਰਨ।
3. ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਰਚਨਾ : ਸਾਧਾਰਨ ਸ਼ਬਦ; ਇਕੱਲਾ ਸੂਰ (ਜਿਵੇਂ ਆ); ਸਰ ਅਤੇ ਵਿਅੰਜਨ (ਜਿਵੇਂ ਆਰ) : ਵਿਅੰਜਨ ਅਤੇ ਸੂਰ (ਜਿਵੇਂ ਪਾ); ਵਿਅੰਜਨ ਸੂਰ ਵਿਅੰਜਨ (ਜਿਵੇਂ ਪਾਰ); ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ; ਲਿੰਗ-ਪੁਲਿੰਗ, ਇਕ ਵਚਨ-ਬਹੁ ਵਚਨ; ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ; ਖਾਣ-ਪੀਣ ਅਤੇ ਸਾਕਾਦਾਰੀ ਨਾਲ ਸਬੰਧਿਤ।

### **BSAG-208 Elementary Microbiology (Practical)**

**Credit: 1**

Familiarization with instruments and other materials used in a microbiology laboratory; Preparation of aseptic methods on nutrient broth, slants and agar plate; Methods of sterilization and preparation of media and glassware; Sterilization of nutrient broth by filtration; Plating methods for isolation and purification of bacteria; Identification of bacteria by staining methods; Enumeration of bacteria by staining, pour plate and spread plate methods; Cultivation technology of mushrooms; Tissue culture preparation and maintenance of edible fungi. Spawn production

### **BSAG-209: Water Management and Micro Irrigation (Practical)**

**Credit:1**

Determination of bulk density and field capacity by field methods; Determination of permanent wilting point; Measurement of irrigation water through flumes and weirs; Calculation of irrigation water requirement; Demonstration of furrow, check basin and basin methods of irrigation; Cost estimation of drip irrigation system; Demonstration of filter cleaning, fertigation, injection and flushing of laterals; Erection and operation of sprinkler irrigation system. Measurement of emitter discharge rate, wetted diameter and calculation of emitter discharge variability; Visit to farmers' fields for demonstration of conventional and water saving irrigation systems.

### **BSAG-210 Vegetable Production Technology (Practical)**

**Credit:1**

Planning and layout of kitchen garden; Identification of important vegetable seeds and plants; Raising of vegetable nurseries; Transplanting of vegetable seedlings in main field; Layout of kitchen garden and maintenance; Seed extraction procedure in tomato and brinjal; Intercultural operations in vegetable plots; Sowing of potato and solanaceous fruit crops, root crops and cucurbitaceous vegetables; Seed production in vegetable crops; Harvesting indices of different vegetable crops. Grading and packing of vegetables; Visit to commercial vegetable farms.

### **BSAG-211 Biology II (Practical)**

**Credit:1**

Study of cell structure and cell division; Microscopic study of histological preparations of simple and compound tissues; Anatomy of a mammal; Slides of frog development; General survey of animal kingdom up to classes

**BSAG-212 Computer Applications in Agriculture (Practical)**

**Credit: 1**

Applications- MS WORD- Word processing and units of document, features of word processing packages; Creating, editing, formatting and saving a document in MS WORD; Prepare own bio data, writing mathematical equations involving sub/super scripts, splitting a paragraph in columns

MS EXCEL- electronic spreadsheets; concept; packages; Creating, editing and saving a spreadsheet; diagrammatic presentations and Use of data analysis tools- correlation and regression, t-test for two-samples with one-way classification. Creating diagrams and other statistical functions

MS ACCESS- Concept of database; Units of database; creating database- Illustration through examples

MS POWER POINT- prepare agriculture based presentation with special features (with photographs, charts, bullet points etc) of Power Point Package