

**Syllabus**  
**B. Sc. (Ag) Hons. Part-I, Semester-I**  
**Agriculture University, Jodhpur**

**Courses & Credits**

| <b>Course No.</b> | <b>Course Title</b>                                 | <b>Credits</b>  |
|-------------------|---|-----------------|
| AGRON-4111        | Introductory Agriculture and Principles of Agronomy | 3(2+1)          |
| PBG-4111          | Principles of Genetics                              | 3(2+1)          |
| SCHEM-4111        | Introduction to Soil Science                        | 3(2+1)          |
| EXTED-4111        | Dimensions of Agricultural Extension                | 2(1+1)          |
| PPATH-4111        | Agricultural Microbiology                           | 3(2+1)          |
| COMP-4111         | Introduction to Computer application                | 2(1+1)          |
| MATHS-4111        | Elementary mathematics                              | 2(2+0)          |
| ENG-4111          | Comprehension and Communication Skills in English   | 3(2+1)          |
| NSNC-4221         | NCC/NSS   | -               |
|                   | <b>Total</b>  | <b>21(14+7)</b> |



# Syllabus

## **B. Sc. (Ag) Hons. Part-I, Semester-I**

### **Agriculture University, Jodhpur**

**AGRON -4111      Introductory Agriculture and Principles of Agronomy**

**3 (2+1)**

**Theory:**

Definition and importance of Agriculture; Meaning and scope of Agronomy; Plant growth and development –concept and differences; general growth curves , factors affecting crop production, Classification of crops; Meaning and types of tillage and tith; Soil fertility and productivity ; Soil erosion- nature, extent and types; Soil conservation- meaning , agronomic and common mechanical practices; Agro-climatic zones of Rajasthan and India and National, International Agricultural Research Institutes in India and abroad.

Art, science and business of crop production; Agricultural heritage; Chronological agricultural technology development in India; Ancient Indian Agriculture in Civilization Era; Conversion of man from food gatherer to food producer; Development of Agriculture through Kautilya's work; Tools to predict monsoon rain; Plant protection in ancient and medieval India; Forest management and products, history of some indigenous trees.

**Practical:**

Identification of crop seeds and plants; Identification of fertilizers and manures; Acquaintance with farm tools and implements; Methods of ploughing and sowing; Preparation of seed beds of crops; Calculation on plant population ; Calculation of soil and water losses from runoff plots ; Identification of grasses, legumes and trees for soil conservation.

**Suggested Readings:**

- 1 De, Gopal Chandra 1989, Fundamentals of Agronomy. Oxford & IBH Publishing Co., New-Delhi.
- 2 ICAR 1989 Handbook of Agriculture, Indian Council of Agricultural Research, New-Delhi.
- 3 Michael, A.M. and Ojha, T.P. 1986. Principles of Agricultural Engineering, Vol.II Jain Brothers, New-Delhi.
- 4 Morachan, Y.B. 1986, Crop production and management, Oxford & IBH Publishing Co., New-Delhi.
- 5 Porwal, B.L. and Sharma, D.D. 1991. Sashya Vigyan Ke Adhunic Siddhant (Hindi) Alka Publishers, Ajmer
- 6 Darashikoh –Nuskha Dar Fanni –Falahat (The Art of Agriculture). Translated from Persian to English by Razia Akbar (2000) with commentaries by K.L. Mehra, K.L. Chadhan, J.S. Kanwar and Y.L. Nene. Asian Agri- History Foundation, Secunderabad, Bull No. 3, pp : 136.
- 7 Kashyapa – Kashuliya Krishisukti (A Treatise on Agriculture by Kashyapa). Translated from Sanskrit to English by S.M. Ayachit (2002) with commentaries by Nalini Sadhale and Y.L. Nene, Asian Agri-History Foundation, Secunderabad, Bull No. 4. pp : 168.
- 8 NCA (1976), Reports of the National Commission on Agriculture, Govt. of India, New Delhi. Ojha, Madhusudan (1942), Kadambini (Sanskrit), Pub. Pradyumna Sarma Ojha, Jaipur.
- 9 Parashara – Krishi Parashara (Agriculture by Parashara). Translated from Sanskrit to English by Nalini Sadhale (1999) with commentaries by H.V. Balkundi and Y.L. Nene. Asian Agri-History Foundation, Secunderabad, Bull No. 2, pp : 104.
- 10 Rapala – Vrikshayurveda (The Science of Plant life). Translated from Sanskrit to English by Nalini Sadhale (1996) with commentaries by K.L. Mehra, S.M. Virmani and Y.L. Nene. Asian Agri-History Foundation, Secunderabad, Bull No. 1, pp : 104.
- 11 Nene, Y.L. and Choudhary, S.L. 2002. agricultural Heritage in India. Asian Agri-History Foundation (AAHF), Secunderabad, Rajasthan Chapter of AAHF, Udaipur.
- 12 Nene, Y.L. 2007. Glimpses of the Agricultural Heritage of India. Asian Agri- History Foundation, Secunderabad, Andhra Pradesh.
- 13 Choudhary, S.L., Sharma, G.S. and Nene, Y.L. 2000. Ancient and Medieval History of Indian Agriculture. Rajasthan College of Agriculture, Udaipur, Rajasthan.

# Syllabus

## **B. Sc. (Ag) Hons. Part-I, Semester-I**

### **Agriculture University, Jodhpur**

**PBG -4111**

**Principles of Genetics**

**3 (2+1)**

**Theory:**

History OF Genetics. Ultra structure of cell. Cell organelles and their function. Chromosome structure, function and chemical composition – karyotype and ideogram. Cell division : types and their significance. Mendel's laws of inheritance. Gene interaction and their types. Multiple alleles and some classical examples. Inheritance of quantitative and qualitative characters and differences between them. Multiple factor hypothesis. Pleiotropism, penetrance and expressivity. Mechanism of crossing over and cytological proof of crossing over. Linkage-types and importance. Estimation of linkage. DNA and its structure, function, types, mode of replication and repair. RNA and its structure, function and types, transcription, translation, genetic code and protein synthesis. Cytoplasmic inheritance – its characteristic features and difference between chromosomal and cytoplasmic inheritance. Structural chromosomal aberrations. Numerical chromosomal aberrations (polyploidy) and evolution of different crop species like cotton, wheat, tobacco and brassicas. Mutation-characteristics, classification and induction.

**Practical:**

Introduction to Microscopy - Simple and compound microscope. Study of typical plant cell. Preparation and use of fixatives and stains. Preparation of micro slides and identification of various stage of cell division. Monohybrid ratio and its modification. Dihybrid ratio and its modification. Test of goodness of fit of genetic ratio. Study of different types of gene interactions and modifications of typical dihybrid F<sub>2</sub> ratios. Study and detection of linkage in F<sub>2</sub> and test cross progeny. Demonstration of structural aberrations and polyploidy.

**Suggested Readings:**

- 1 Gupta, P.K. 2004. Cytology, Genetics and evolution. Rastogi Publications, Meerut.(Hindi Edition).
- 2 Kaushik, M.P. 2003. A Text Book of Modern Botany. Prakash Publications, Muzaffarnagar (U.P.).
- 3 Klug, W.W. and Cummings, M.R. 2005. Concepts of genetics Pearson Education (Singapore) Pvt. Ltd., Indian Branch, Pratap Ganj, New Delhi
- 4 Singh, B.D. 2001. Fundamentals of Genetics, Kalyani Publishers, New Delhi.
- 5 Strickberger, M.W. 2001. Genetics. Prentice Hall of India Pvt. Ltd., New Delhi.



# Syllabus

## **B. Sc. (Ag) Hons. Part-I, Semester-I**

### **Agriculture University, Jodhpur**

SCHEM- 4111

Introduction to Soil Science

3(2+1)

#### **Theory:**

Soil: Pedological and edaphological concepts. Origin of the earth, Earth's crust; Composition, Rocks and minerals. Weathering, Soil formation factors and processes. Components of soils. Soil profile, Soil physical properties, Soil texture, Textural classes, Particle size analysis, Soil structure, Classification, Soil aggregates, significance, Soil consistency, Soil crusting, Bulk density and particle density of soils & porosity and their significance and manipulation. Soil colour. Soil water, Retention and potentials, Soil moisture constants, Movement of soil water, Infiltration, Percolation, Permeability, Drainage. Methods of determination of soil moisture. Thermal properties of soils, Soil temperature. Soil air, Gaseous exchange, Influence of soil temperature and air on plant growth. Soil colloids : Properties, nature, types and significance; Layer silicate clays, and sources of charges. Adsorption of ions, Ion exchange, CEC & AEC, Soil reaction and buffering capacity. Factors influencing ion exchange and its Significance. Problem soils – acid, salt affected and calcareous soils, characteristics. Reclamation – mechanical, chemical and biological methods. Irrigations water – Quality of irrigation water and its appraisal. Indian standards for water quality. Use of saline water for agriculture.

#### **Practical:**

Collection and processing of soil sample. Identification of rocks and minerals. Determination of bulk density and particle density, Soil moisture determination, Soil moisture constants – Field capacity, permanent wilting point, Water holding capacity Infiltration rate, Soil texture and mechanical analysis, Soil temperature, Soil analysis for CEC, pH, EC, soluble cations & anions.

#### **Suggested Readings:**

- 1 Sharma, N.L. & Singh, T.B. (1996) Soil Science ( Hindi ed.) Rama pub. House, Barot Merrut ( U.P )
- 2 Baver, L.D. Gardener, W.H. and gardener W.R.(1976) Soil Physics Wiley Eastern Ltd, New Delhi
- 3 Biswas, T.D. and Mukherjee, S.K. (2006) Text book of soil science. Tata McGraw Hill publishing Co. Ltd, New Delhi
- 4 Brady, N.C. and Weil, R.R. (2002) The nature and properties of soils, prentice hall of India Pvt. Ltd, M-97, Connaught Circus, New Delhi
- 5 Das, D.K. (2002) Introductory Soil Science, Kalyani publisher, New Delhi
- 6 Rai, M.M. (2002) Principal of Soil Science Mac Milan India Ltd, New Delhi
- 7 Mehra R.K. (2004) Text book of Soil Science, ICAR, New Delhi
- 8 ISSS (2002) Fundamentals of Soil Science, Div. of Soil Science, IARI, New Delhi
- 9 Chopra S.L. and Kanwar, J.S. ( 1991) Analytical Agricultural Chemistry, Kalyani publisher, Ludhiana
- 10 Jackson, M.L. (1973 ) Soil chemical analysis, Prentice Hall of India, Pvt. Ltd New Delhi
- 11 Piper, C.S. (1950) Soil and plant analysis. .Hans publications, Bombay
- 12 Richards, L.A. (1960) Diagnosis and improvement of saline and alkali soils., USDA agriculture Hand book 60, Washington D.C., USA
- 13 Gupta, I.C. & Sharma, S.K. (1988) Crop production in salt affected soils, Oxford and IBH Publication, New Delhi.
- 14 Agarwal, R.R., Yadav, J.S.P. & Gupta, R.N. (1982) Saline and alkali soils of India. ICAR, New Delhi.

# Syllabus

## **B. Sc. (Ag) Hons. Part-I, Semester-I**

### **Agriculture University, Jodhpur**

**EXTED-4111**

**Dimensions of Agricultural Extension**

**2(1+1)**

**Theory:**

Education- Meaning, Definition, Types-Formal, Informal and Non-formal Education. Extension Education - Meaning, Definition, Concept, Objectives, Principles, Scope and Importance. Development programmes of pre-independence era – Sriniketan, Marthandam, Gurgaon experiment and Gandhian constructive programme with special reference to year of start, objectives and activities. Development Programmes of post-independence era-Etawah Pilot Project,Community Development Programme – Meaning, Definition, Concept, Objectives, Difference between Community Development and Extension Education, National Extension Service. Panchayati Raj System/ Democratic Decentralization/ Three tiers system of Panchayati Raj – Concept, Meaning, Organizational set-up and Functions. Agricultural Development Programmes with reference to year of start, objectives & salient features- Institution Village Linkage Programme(IVLP), National Agricultural Technology Project (NATP), ATMA, ATIC, KVK & NAIP. Poverty Alleviation Programmes- Integrated Rural Development Programme (IRDP), Swarna Jayanti Gram Swarajgar Yojana (SGSY),National Rural employment act (NREGA). Reorganized Extension System (T & V System) – Concept & Methodology.

**Practical:**

Visit to KVK/ Extension Wing/ ATIC/ ATMA to study their functioning. Visit to Panchayati Raj Institutions to study the functioning of Gram Panchayat (GP) & Other Institutions. Visit and study the District Rural Development Agency (DRDA). Visit to a village to study the Self Help Groups (SHG). Visit to a voluntary organization to study the developmental activities. Organizing PRA techniques in a village to identify the agricultural problems.

**Suggested Readings:**

- 1 Dahama, O.P. & Bhatnagar, O.P.1985. Education and Communication for Development, Oxford & IBH Publishing Co. New-Delhi.
- 2 Kelsey, L.D. & Hearne, C.C. 1963. Cooperative Extension Work: Cornell University Press, New York, USA.
- 3 Ray, G.L. 2003. Extension Communication and Management, Naya Prakash, 206 Bidhan Sarni, Calcutta-6.
- 4 Reddy, A.A. 1993. Extension Education, Shri Laxmi Press, Bapatala.



# Syllabus

## **B. Sc. (Ag) Hons. Part-I, Semester-I**

### **Agriculture University, Jodhpur**

**P. PATH- 4111**

**Agricultural Microbiology**

**3 (2+1)**

#### **Theory:**

History of microbiology: Theory of spontaneous generation, role of microbes in fermentation, germ theory of disease, protection against infections. Applied areas of microbiology. Metabolism in bacteria: ATP generation, chemoautotrophy, photoautotrophy, respiration, fermentation. Bacteriophages : structure and properties - Lytic and lysogenic cycles: viroids, prions . Bacterial genetics : Genetic recombination, transformation, conjugation and transduction. Genetic engineering, plasmids, episomes, genetically modified organisms. Soil microbiology : microbial groups in soil; microbial transformations of carbon, nitrogen, phosphorus and sulphur ; Biological nitrogen fixation. Plant microbe interaction. Rhizosphere and phyllosphere microflora. Beneficial microorganism in agriculture : biofertilizers – Rhizobium, mycorrhiza, azolla; microbial insecticides, microbial agents for control of plant diseases . Microbes in composting. Microbiology of water : marine water, fresh water, potable water; Food microbiology : microbial spoilage and food preservation. Biodegradation of pesticides. Biogas production.

#### **Practical:**

Acquaintance with equipments, glasswares etc. in microbiology laboratory. Acquaintance with microscope. Disinfection and sterilization methods. Preparation of culture media for fungi and bacteria. Isolation of microbes from infected plant parts. Isolation and purification of bacteria by streak plate method. Staining and slide preparation of fungi. Staining of bacteria- simple and differential staining. Staining of endospore. Determination of quality of milk sample by methylline blue reductase test. Enumeration of bacteria present in soil and water.

#### **Suggested Readings:**

- 1 Biswas, T.D. and Mukherjee, S.K. 1990. Text Book of Soil Sciences, Tata McGraw-Hill Publishing Company Limited, New Delhi.
- 2 Mukherjee, N. and Ghosh T. 1998. Agricultural Microbiology, Kalyani Publishers, New Delhi
- 3 Pelczar, Jr. Michel J. Chan, E.C.S. and Krieg, Noel R. 1997. Microbiology. Tata McGraw -Hill Edition, 1993. India.
- 4 Rangaswami, G. and Bagyaraj, D.J. 1993. Agricultural Microbiology. Prentice Hall of India Pvt. Limited, New Delhi.
- 5 Rao, N.S. 2000. Soil Microbiology, Oxford & IBH Publishing Co.Pvt.Ltd., New Delhi.
- 6 Vishunavat, K. and Kolte, S.J. 2005. Essentials of Phytopathological Techniques. Kalyani Publishers, New Delhi.

# Syllabus

## **B. Sc. (Ag) Hons. Part-I, Semester-I**

### **Agriculture University, Jodhpur**

**COMP-4111**

**Introduction to Computer Applications**

**2(1+1)**

#### **Theory:**

Unit I- Historical Evolution of Computers, Computer System Concepts, Capabilities and Limitations, Types of computer: Analog, Digital, Hybrid, General Purpose, Special Purpose, Micro, Mini, Mainframe, Super, Generations of Computers, Type of PCs- Desktop, Laptop, Palmtop etc. their Characteristics, Computer Security, Basic Components of Computer System CPU, Input/Output and Memory, their Functions and Characteristics. Memory-RAM, ROM, EPROM, PROM and other type of Memory.

Unit II- Keyboard, Mouse, Digitizing Tablets, Scanners, Digital Cameras, MICR, OCR, OMR, Bar Code Reader, Voice Recognition, Light Pen, Touch Screen, Input/Output Devices, Monitors-Analog, Digital and Characteristics-size, Resolution, Video Standard-VGA, SVGA, XGA etc. Printers-Dot Matrix, Inkjet, Laser, Line Printer, Plotter, Sound Card and Speakers, Various Storage Devices- Magnetic Tape, Magnetic Disk, Cartridge Tape, Hard Disk Device, Floppy Disk, Optical Disk-CD, VCD, CD-R, CD-RW, DVD, Zip Drive.

Unit III- MS-Windows: Introduction to MS-Windows, Concept of GUI, Desktop and its elements, Windows explorer, Control Panel, Accessories, Running Application under MS Windows, Advantages and Limitation of Windows, various Versions of windows Like (Win 95,98,Win ME, 2000 XP), Hardware requirement for Windows XP.

Unit IV- Basic concept of MS Word Processor, MS Excel, MS Power Point, Features of word processing packages, MS Excel packages, Power Point Package. Internet: world Wide Web (WWW), Concept, Web Browsing and Electronic Mail, concept of Networking.

#### **Practical:**

Study of Computer Components; Booting of Computer and its Shut Down; Practicing WINDOWS Operating System, Use of Mouse and Keyboard, Title Bar, Start Menu, Minimum, Maximum and Close Buttons, Scroll Bars, Menus and Tool Bars; Setting time and date, Starting and Shutting down of Window, WINDOWS Explorer, Creating File and Folders, COPY and PASTE functions;

MS-Word: Introduction to MS Word. Creating a Document, Saving and Editing, Word Proofing Tools- Using Spelling Checker, Working with Grammar Checker, Using Thesaurus, Working with Auto Text Feature in Word, Using Auto Correct Feature, Word Count, Text Formatting, Document Formatting (Page Formatting), Alignment of text, Creating Tables, Merging of Cells, Column and Row width and Chart in Word, Working with Mail Merge, Graphics and Web Pages in word.

MS-Power Point: Introduction to MS Power Point. Power Point Slide Creation, Slide Show, Editing, Animation, Adding a Picture, Adding Graphics, Formatting, Customizing, Printing and Other inbuilt Additional Function.

MS Excel: Introduction to MS Excel. Creating a Spreadsheet, Editing and saving. Working With Toolbars, Formatting, Formulas, Data Management, Graphs & Chart, Macros, Goal Seek Pivot Table, Financial Functions and Other inbuilt Additional Function. Data Analysis using inbuilt Tool Packs, Correlation & Regression

Internet Browsing: Browsing a Web Page and Creating of E-Mail ID

**Syllabus**  
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**MATHS-4111**

**Elementary Mathematics**

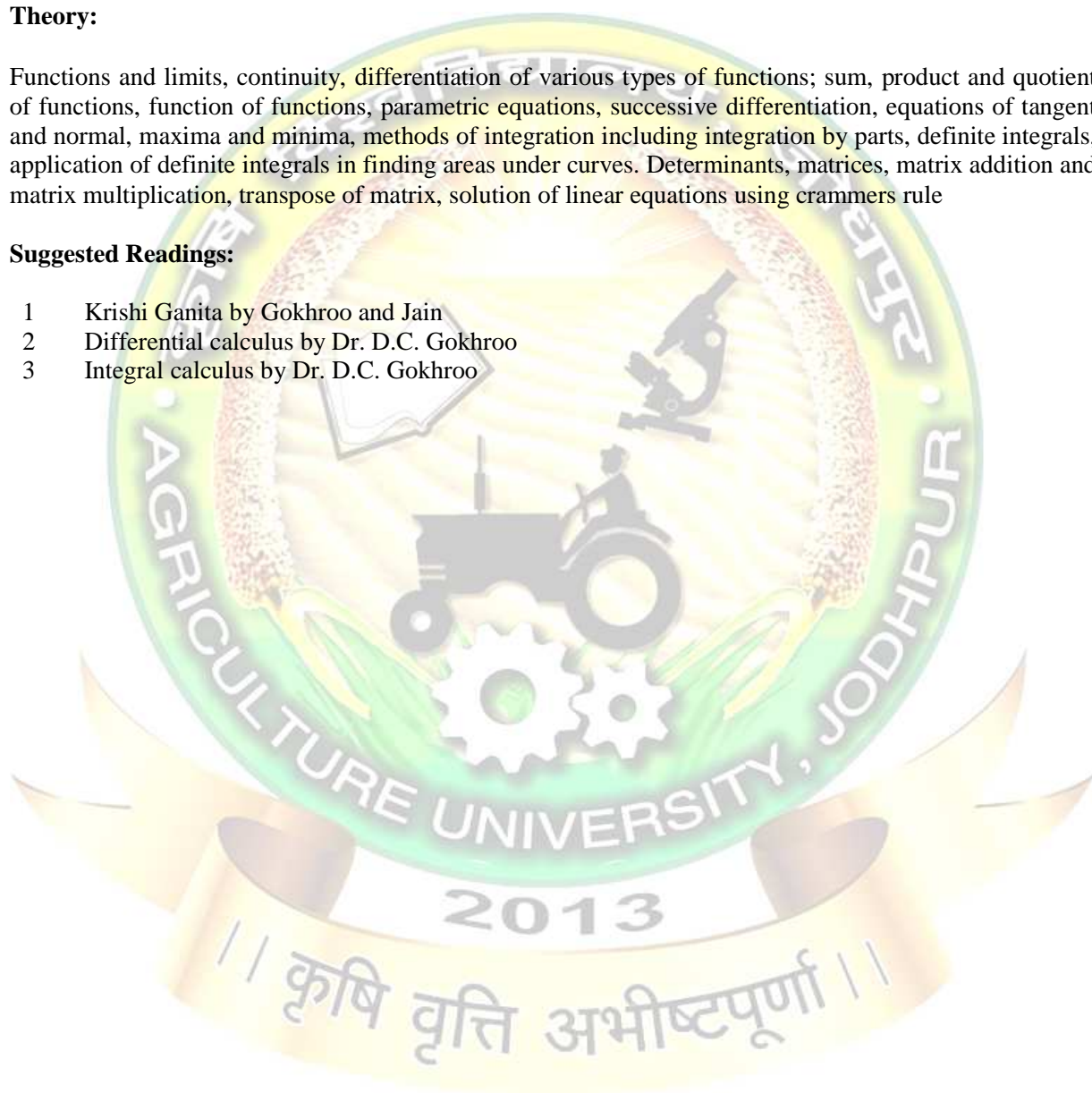
**2(2+0)**

**Theory:**

Functions and limits, continuity, differentiation of various types of functions; sum, product and quotient of functions, function of functions, parametric equations, successive differentiation, equations of tangent and normal, maxima and minima, methods of integration including integration by parts, definite integrals, application of definite integrals in finding areas under curves. Determinants, matrices, matrix addition and matrix multiplication, transpose of matrix, solution of linear equations using crammers rule

**Suggested Readings:**

- 1 Krishi Ganita by Gokhroo and Jain
- 2 Differential calculus by Dr. D.C. Gokhroo
- 3 Integral calculus by Dr. D.C. Gokhroo





# Syllabus

## **B. Sc. (Ag) Hons. Part-I, Semester-I**

### **Agriculture University, Jodhpur**

**ENG-4111:                      Comprehensive and Communication Skills in English                      3(2+1)**

#### **Theory:**

Comprehension: Text for Comprehension: **Current English for Colleges**, by N.Krishnaswami & T. Sriraman (Macmillan India Limited, Madras, 1995).

Grammar & usage: Tenses, Active/Passive Voice, Reported Speech, Prepositions, Phrasal Verbs, Concord, Determiners

Vocabulary: Synonyms, antonyms, homonyms, homophones

Composition: a) Letter and Application Writing: Personal/Business Correspondence, Preparation of Curriculum vitae and job applications

b) Précis writing

#### **Practical:**

Phonetics (symbols) and transcriptions

Listening Comprehension: Listening to at least two tape recorded conversations aimed at testing and listening comprehension of students.

Spoken English practice by using Audiovisual aids ,oral presentation of reports, one presentation by individual on the given topics related to Agriculture like WTO , developing new technology in Agriculture, , Bio fertilizers etc.

Reading skills: using dictionary, rapid reading, intensive reading

Practice of Presentation by using Power Point and Data Projector

Group discussion and debates on current topics.

#### **Suggested Readings:**

- 1 Thomson and Martinet ( 1995) "A Practical English Grammar" OUP Publication
- 2 Thomson and Martinet ( 1997) "A Practical English Grammar, Exercise Books Vol. I & II" OUP Publication
- 3 Michal Swan(1995) "A Practical English Grammar" OUP Publication
- 4 David Green (1990) "Contemporary English Grammar Structure Composition" McMillan.
- 5 A.S. Hornby (1997) "Advance Learner's Dictionary" OUP Publication
- 6 Krishnamohan " Speaking English Effectively" McMillan
- 7 Work Book of Indira Gandhi National Open University, Delhi. (Course No. Feg.1,Feg.2 and Feg.3)
- 8 Audiovisual tapes prepared by British Council, New Delhi and CIEFL, Hyderabad.

# Syllabus

## **B. Sc. (Ag) Hons. Part-I, Semester-I**

### **Agriculture University, Jodhpur**

NSNC-4221

NCC/NSS

1(0+1)

NSS: Orientation of students in national problems, study of philosophy of NSS, fundamentals rights, directive principles of state policy, socio-economic structure of Indian society, population problems, brief of five year plan. Functional literacy, non-formal education of rural youth, eradication of social evils, awareness programmes, consumer awareness, highlights of consumer act. Environment enrichment and conservation, health, family welfare and nutrition.

NCC: Introduction to NCC, defence services, system of NCC training, foot drill, sizing, forming up in three ranks, open and close order march, dressing, getting on parade, dismissing and falling out, saluting, marching, arms drill, shoulder arm, order arm, present arm, guard of honour, ceremonial drill, weapon training – rifle bayonet, light machine gun, sten machine carbine. Introduction and characteristic stripping, assembling and cleaning, loading, unloading and firing. Field craft, visual training, targets, judging distance, fire discipline and fire control orders, battle craft, field signals, description of ground, section formation, section battle drill, scouts and patrols, ambush, field engineering, map reading, conventional signs, grid systems, use of service protractor, prismatic compass and its use, self defence, general principles, precautions and training, attacks and counter attacks, marching and searching, first aid, hygiene and sanitation, civil defence, leadership and NCC song.

Physical Education: Introduction to physical education. Posture, exercise for good posture, physical fitness exercises for agility, strength, coordination, endurance and speed. Rules regulations of important games, skill development in any one of the games, football, hockey, cricket, volleyball, badminton, throw ball, tennis. Participation in one of the indoor games, badminton, chess and table tennis. Rules and regulations of athletic events, participation in any one of the athletic events, long jump, high jump, triple jump, javelin throw, discus throw, shot put, short and long distance running. Safety education, movement education, effective way of doing day-to-day activities. First-aid training, coaching for major games and indoor games. Asans and indigenous ways for physical fitness and curative exercises. Exercises and games for leisure time, use and experience.

Note: Warming up and conditioning exercises are compulsory before the commencement of each class.

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