

Medi-Caps University, Indore
Faculty of Agriculture
Model New Scheme as per Medi-Caps University

First Year (ODD Semester - I Sem)						
Sr. No.	Subject Code	Courses	L	T	P	Credit
1	AG3CO01	Fundamentals of Horticulture	1	0	1	2
2	AG3CO02	Fundamentals of Plant Biochemistry and Biotechnology	2	0	1	3
3	AG3CO03	Fundamentals of Soil Science	2	0	1	3
4	AG3CO04	Introduction to Forestry	1	0	1	2
5	AG3CO05	Fundamentals of Agronomy	3	0	1	4
6	AG3CO06	Rural Sociology & Educational Psychology	2	0	0	2
7	AG3SE01	Comprehension & Communication Skills in English	1	0	1	2
8	AG3RC01	Introductory Biology	1	0	1	2
9	AG3RC02	Elementary Mathematics	2	0	0	2
10	AG3RC03	Agricultural Heritage	1	0	0	1
		Total	16	0	7	23



Syllabus
I Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3RC02	Elementary Mathematics	2	-	0	2	2

Course Objectives:

1. To equip the students with the knowledge of straight lines.
2. To provide the knowledge of circle and its general equation
3. To impart the knowledge of differential calculus.
4. To equip the students with the knowledge of Logarithmic differentiation
5. To understand the matrix theory and determinant.

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Straight lines

Straight lines : Distance formula, section formula (internal and external division), Change of axes (only origin changed), Equation of co-ordinate axes, Equation of lines parallel to axes, Slope-intercept form of equation of line, Slope-point form of equation of line, Two point form of equation of line, Intercept form of equation of line, Normal form of equation of line, General form of equation of line, Point of intersection of two st. lines, Angles between two st. lines, Parallel lines, Perpendicular lines, Angle of bisectors between two lines, Area of triangle and quadrilateral.

Unit- 2:-Circle

Circle: Equation of circle whose centre and radius is known, General equation of a circle, Equation of circle passing through three given points, Equation of circle whose diameters is line joining two points (x_1, y_1) & (x_2, y_2) , Tangent and Normal to a given circle at given point (Simple problems), Condition of tangency of a line $y = mx + c$ to the given circle $x^2 + y^2 = a^2$.

Unit-3:- Differential Calculus

Differential Calculus :Definition of function, limit and continuity, Simple problems on limit, Simple problems on continuity, Differentiation of x^n , e^x , $\sin x$ & $\cos x$ from first principle, Derivatives of sum, difference, product and quotient of two functions, Differentiation of functions of functions (Simple problem based on it),

Unit-4:-Logarithmic differentiation

Logarithmic differentiation (Simple problem based on it), Differentiation by substitution method and simple problems based on it, Differentiation of Inverse Trigonometric functions. Maxima and Minima of the functions of the form $y=f(x)$ (Simple problems based on it).

Unit-5:-Matrices and Determinants

Integral Calculus : Integration of simple functions, Integration of Product of two functions, Integration by substitution method, Definite Integral (simple problems based on it), Area under simple well-known curves (simple problems based on it). Matrices and Determinants: Definition of Matrices, Addition, Subtraction, Multiplication, Transpose and Inverse up to 3rd order, Properties of determinants up to 3rd order and their evaluation.

Case Studies:

Optional

List of Practicals:

Not Applicable.

Project:

Optional.

Course Outcomes:

- A. Students will be able to apply the knowledge of straight lines in real life.
- B. Students will be able to understand circle and tangent, normal to a given circle.
- C. Students will be able to understand the concept of derivative and to find the maxima and minima.
- D. Students will be able to solve Logarithmic.
- E. Students will be able to understand the operation of matrices and to find the determinant of matrix.

Text Books:

1. *1.Mathematics XI and XII NCERT, New Delhi.*
2. *Mathematics Class XI , R. D. Sharma, Dhanpat Rai Publications, New Delhi.*
3. *Coordinate geometry of two diamensions, Hari Kishan, Atlantic Publishers and Distributeres*

Reference Books:

- A. *1.Applied Mathematics, R. D. Sharma, Dhanpat Rai Publications, New Delhi*
- B. *2.Elementary Engineering Mathematics, B. S. Grewal, Khanna Publication.*

Web Source:

1. nptel.ac.in/courses/105105045/40
2. nptel.ac.in/courses/111107058/

Open Learning Source:

1. <https://swayam.gov.in/courses/public>
2. <http://nptel.ac.in/course.php>
3. <http://ecoursesonline.iasri.res.in/Courses/Mathematics/Start%20to%20read%20the%20Course.htm>



मेडी-केप्स विश्वविद्यालय, इंदौर

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Syllabus
I Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3RC03	Agricultural Heritage	1	-	0	1	1

Course Objectives:

1. To attain knowledge about agricultural heritage
2. To know about status of agriculture
3. To understand about plant production through indigenous traditional knowledge
4. To study about importance of agriculture
5. To gain importance of current scenario of Indian agriculture

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Introduction of Agricultural heritage

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

Unit-2:- Status of Agriculture

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

Unit-3:- Plant Production Through Indigenous Traditional Knowledge

Plant production and protection through indigenous traditional knowledge; Crop voyage in India and world

Unit-4:- Importance of agriculture

Agriculture scope; Importance of agriculture and agricultural resources available in India

Unit-5:- Current scenario of Indian agriculture

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

Case Studies:

Optional

Project:

Optional.

Course Outcomes:

- A. The students will be able to know about agricultural heritage
- B. The students will gain the knowledge of status of agriculture
- C. The students will understand about plant production through indigenous traditional knowledge
- D. The students will study about importance of agriculture
- E. The students will gain importance of current scenario of Indian agriculture

Text Books:

1. *M.S. Randhawa, A history of agriculture in india, Vol. IV, ICAR, New Delhi, latest edition*
2. *D. Kumari, Textbook on Agricultural heritage of India, Agrotech pulishing academy, latest edition*
3. *S.R.Reddy, Principal of Agronomy, Kalyani Publication, latest edition*

Reference Books:

1. *Y.L. Nene and R.C. Saxena, A textbook on ancient history of Indian agriculture, Munshiram Mnhorilal publishers pvt. Ltd. latest edition*
2. *Handbook of Agriculture, ICAR, New Delhi latest edition*

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Introductory%20Agriculture/AGRO102/Start%20to%20read%20the%20Course.html>
2. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Agronomy%20&%20agrc%20&%20Agronomy/AGRO101/Start%20to%20read%20the%20Course.html>

Open Learning Source:

2. https://nptel.ac.in/agmoocs_news.php
1. <https://swayam.gov.in/>



Syllabus
I Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO05	Fundamentals of Agronomy	3	-	2	5	4

Course Objectives:

1. To understand the importance of cultivation and the impact of latest crop management practices on crop productivity.
2. To gain knowledge on irrigation and to comprehend the role of physiological processes controlling plant growth and development.
3. To gain technical knowledge on weeds and to understand the ecological principles that governs crop-weed interactions.
4. To gain knowledge about Growth and development of crops.
5. To gain technical knowledge of Crop management technologies

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction of Agronomy

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

Unit- 2:-Irrigation

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

Unit-3:- Weeds

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

Unit-4:-Growth and development

Growth and development of crops, factors affecting growth and development, plant ideotypes, crop rotation and its principles,

Unit-5:-Crop management technologies

Adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

Case Studies:

Optional

List of Practical's:

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

Project:

Optional.

Course Outcomes:

- A. The students will be able to prepare the field for cultivation.
- B. The students will understand the water use efficiency for cultivation.
- C. The students will understand the establishment of crop-weed association and critical period of crop-weed competition
- D. Student will come to know about the Growth and development of crops.
- E. Student will know the Crop management technologies

Text Books:

1. Balasubramanian, P. and Palaniappan, S.P. 2016. *Principles and Practices of Agronomy (2nd edition)*, Agrobios (India), Jodhpur
2. Reddy, T. Yellamanda and Reddy, G.H. Sankara. 2016. *Principles of Agronomy (2nd edition)*, Kalyani Publishers, Ludhiana
3. Reddy, S.R. 2012. *Principles of Crop Production (4th edition)*, Kalyani Publishers, Ludhiana.
4. De, Gopal Chandra 1989, *Fundamentals of Agronomy*. Oxford & IBH Publishing Co., New-Delhi.
5. Mishra, R.D. and Ahmed, M. 1987. *Manual on Irrigation Agronomy*, Oxford & IBH Publishing Co. Pvt. Ltd., New-Delhi.

Reference Books:

1. Michael, A.M. 1987. *Irrigation - Theory and Practice*, Vikas Publishing House Pvt. Ltd., New-Delhi.
2. Panda, S.C. 2012. *Modern Concepts and Advance Principles in Crop Production*. Agrobios (India), Jodhpur
3. Gupta, O.P. 2005. *Weed Management: Principles and Practices (2nd Ed)* Agrobios (India) Jodhpur.
4. ICAR. 2010. *Handbook of Agriculture (6th edition)*, Indian Council of Agricultural Research, New Delhi.

Web Source:

1. <http://www.agriinfo.in/default.aspx?page=topiclist&superid=1&catid=37>
2. http://agritech.tnau.ac.in/agriculture/agri_weedmgt.html

Open Learning Source:

<https://swayam.gov.in/courses/public>

1. <http://nptel.ac.in/course.php>
2. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Agronomy%20&%20agrcrlr%20Meteorology/AGRO101/Start%20to%20read%20the%20Course.html>



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I Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3SE01	Comprehension & Communication Skills in English	1	-	2	3	2

Course Objectives:

1. To attain knowledge about introductory english
2. To know about comprehension skills
3. To understand about grammar
4. To study about writing skill
5. To gain importance of communication skill

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Introduction

War Minus Shooting- The sporting Spirit. A Dilemma- A layman looks at science Raymond B. Fosdick. You and Your English – Spoken English and broken English G.B. Shaw.

Unit- 2:- Comprehension skills

Reading Comprehension, Vocabulary- Antonym, Synonym, Homophones, Homonyms, often confused words. Exercises to Help the students in the enrichment of vocabulary based on TOEFL and other competitive examinations.

Unit-3:- Grammar

Functional grammar: Articles, Prepositions, Verb, Subject verb Agreement, Transformation, Synthesis, Direct and Indirect Narration.

Unit-4:- Writing skill

Written Skills: Paragraph writing, Precise writing, Report writing and Proposal writing. The Style: Importance of professional writing.

Unit-5:- Communication skill

Preparation of Curriculum Vitae and Job applications. Synopsis Writing. Interviews: kinds, Importance and process.

Case Studies:

Optional

List of Practicals:

1. Listening Comprehension: Listening to short talks lectures, speeches (scientific, commercial and general in nature).
2. Oral Communication: Phonetics, stress and intonation, Conversation practice.
3. Conversation: rate of speech, clarity of voice, speaking and Listening, politeness
4. Reading skills: reading dialogues, rapid reading, intensive reading, improving reading skills.
5. Mock Interviews: testing initiative, team spirit, leadership, intellectual ability.
6. Group Discussions.

Project:

Optional.

Course Outcomes:

- A. The students will be able to know about extension and education
- B. The students will gain the knowledge of various extension programmes in India
- C. The students will understand about various rural and community development
- D. The students will study about Monitoring evaluation and extension teaching methods
- E. The students will gain importance of communication and journalism

Text Books:

1. Covey Stephen R. 1989. *The Seven Habits of Highly Successful People*. Free Press.
2. Verma, K.C. 2013. *The Art of Communication*. Kalpaz.\

Reference Books:

1. Mohan Krishna and Meera Banerjee. 1990. *Developing Communication Skills*. Macmillan India Ltd. New Delhi.

Web Source**Open Learning Source:**



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Syllabus
I Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO01	Fundamentals of Horticulture	1	-	2	3	2

Course Objectives:

1. attain knowledge about introduction of Horticulture
2. To know about propagation strategy in Horticulture
3. To understand about principles and methods of orchard establishment
4. To study about **pollination and plant bio-regulators**
5. To gain importance of **irrigation**

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction of Horticulture

Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification.

Unit-2:-Propagation strategy in Horticulture

Climate and soil for horticultural crops; Plant propagation-methods and propagating structures; Seed dormancy, Seed germination.

Unit-3:- Principles and methods of orchard establishment

Principles of orchard establishment; Principles and methods of training and pruning, juvenility and flower bud differentiation; unfruitfulness.

Unit-4:-Pollination and plant bio-regulators

Pollination, pollinizers and pollinators; fertilization and parthenocarpy; medicinal and aromatic plants; importance of plant bio-regulators in horticulture.

Unit-5:-Irrigation

Irrigation – methods, Fertilizer application in horticultural crops.

Case Studies:

Optional

List of Practicals:

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

Project:

Optional.

Course Outcomes:

- A. The students will be able to know about Horticulture
- B. The students will gain the knowledge of propagation strategy in Horticulture
- C. The students will understand about principles and methods of orchard establishment
- D. The students will study about **pollination and plant bio-regulators**
- E. The students will gain importance of **irrigation**

Text Books:

- 1 Chadha, K.L. Handbook of Horticulture (2002) ICAR, New Delhi
2. Jitendra Singh Basic Horticulture (2011) Kalyani Publications, New Delhi
3. K.V.Peter Basics Horticulture (2009) New India Publishing Agency
4. Kausal Kumar Misra and Rajesh Kumar Fundamentals of Horticulture 2014 Biotech Books

Reference Books:

1. Prasad and Kumar Principles of Horticulture 2nd Edn. (2014) Agrobios (India)
2. S. Prasad and U. Kumar A handbook of Fruit Production (2010) Agrobios (India)
3. Kausal Kumar Misra and Rajesh Kumar Fundamentals of Horticulture 2014 Biotech Books

Web Source:

1. <https://www.agriinfo.in/default.aspx?page=topiclist&superid=2&catid=48>
2. <http://vikaspedia.in/agriculture>
3. <http://kiran.nic.in/>
4. http://agritech.tnau.ac.in/horticulture/horti_index.html

Open Learning Source:

1. http://agritech.tnau.ac.in/horticulture/horti_index.html
2. <https://nptel.ac.in/courses/126105013/#>



Syllabus
I Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO02	Fundamentals of Plant Biochemistry and Biotechnology	2	-	2	4	3

Course Objectives:

1. To impart knowledge on plant cells and its role.
2. To educate on the importance of carbohydrates, proteins, enzymes and lipids.
3. To have a basic knowledge on biosynthesis.
4. To impart knowledge on metabolism of biomolecules.
5. To gain complete knowledge of biotechnology

Prerequisites :12th pass

Co-requisites: Nil

Curriculum:

Unit-1:-Introduction to Biochemistry

Introduction – Historical aspects of Biochemistry– Scope, impact and importance of Biochemistry in plant sciences - Properties of water – PH – Buffers. Plant cell, cell wall and its role in livestock, food and paper industries

Unit-2:-Carbohydrates and lipids

Carbohydrates– Classification - Structures – Monosacharides – Structural aspects.Mutarotation - Reducing and oxidizing properties. Oligosaccharides and polysaccharides- Functions of carbohydrates. Lipids – Fatty acids – Structures and properties – Functions of lipids. Lipids - Classification – Storage lipids and membrane lipids – Saponification, hydrogenation, Iodine number and Acid value. Their industrial application in soaps, detergents, paints, Varnishes, lubricants, adhesives, plastics, nylon, Bio%diesel, Biodegradable plastics etc.

Unit-3:- Amino acid, Protein and Nucleic acid

Amino acids – Structures - Classification – Zwitterions – Titration.Peptides – Oligopeptides – Cyclic and acyclic peptides – Malformin, Glutathione, Gramicidin – Functions of peptides.Proteins –Importance - Classification - Properties of proteins –Isoelectric pH - Denaturation - Protein sequencing – Edman degradation method.Proteins – Structural organization – Primary, secondary, tertiary and quaternary structures and forces involved in stabilizing proteins–Plant proteins and their quality.Nucleic acids – Functions – Structures of nitrogen bases – Nucleosides – Nucleotides in RNA and DNA.Various types of DNA and RNA – Secondary structure of B-DNA and t-RNA.Protein Biosynthesis and post translational modifications.

Unit-4:-Enzymology and secondary metabolites

Enzymes – Characteristics of enzymes – Chemical nature, speed, specificity, active site - activation energy – Mechanism of enzyme action. Measurement of enzyme activity – Factors effecting enzyme activity – Enzyme Inhibition – MM & LB plots. Secondary metabolites – Terpenoids – Alkaloids - Phenolics – Importance - their applications in food and pharmaceutical industries. Metabolism – Anabolism and Catabolism – Stages of respiration – Overall metabolic view of carbohydrates, proteins and lipids. Metabolism of carbohydrates – Glycolysis – Aerobic and anaerobic. Tricarboxylic Acid (TCA) cycle – Glyoxalate cycle – Electron transport chain. Metabolism of lipids – Biosynthesis of fatty acids and tri acyl glycerol. Catabolism of lipids - α , β & γ oxidation of fatty acids in brief and α oxidation in detail.

Unit-5:-Introduction to biotechnology

Concepts and applications of plant biotechnology: Scope, organ culture, embryo culture, cell suspension culture, callus culture, anther culture, pollen culture and ovule culture and their applications; Micro-propagation methods; organogenesis and embryogenesis, Synthetic seeds and their significance; Embryo rescue and its significance; somatic hybridization and cybrids; Somaclonal variation and its use in crop improvement; cryo-preservation; Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and Agrobacterium mediated gene transfer methods; Transgenics and its importance in crop improvement; PCR techniques and its applications; RFLP, RAPD, SSR; Marker Assisted Breeding in crop improvement; Biotechnology regulations.

Case Studies:

Optional

List of Practicals:

1. Preparation of solutions, pH and buffers.
2. Qualitative tests for carbohydrates.
3. Qualitative tests amino acids.
4. Estimation of amylose in rice.
5. Estimation of reducing sugar/Total soluble sugars.
6. Estimation of proteins by Lowry's method.
7. Extraction of oil from oil seeds by Soxhlet apparatus.
8. Effect of pH, temperature and substrate concentration on enzyme action.
9. Sterilization techniques.
10. Composition of various tissues culture media and preparation of stock solutions for MS nutrient medium.
11. Micropropagation – Hardening and acclimatization.

Project:

Optional.

Course Outcomes:

- A. Student will understand the importance of plant cells
- B. Students will know about carbohydrates, proteins, enzymes and lipids.
- C. Students will know the process of biosynthesis.
- D. Student will know about the structure and functions and metabolism of biomolecule
- E. Students will know the knowledge of biotechnology.

Text Books:

1. *S.L. Metha, M.L. Lodha, and P.V. Sane, Recent Advances in Plant Biochemistry. ICAR, 1993.*
2. *U. D. Chavan, J. V. Patil, Key Notes on Biochemistry and Biotechnology, Daya Publishing House, 2015*
3. *J.L. Jain, Fundamentals of Biochemistry. 5th Edn.,S.Chand& Company, 2001.*

Reference Books:

1. *A. Lehninger, Principles of Biochemistry. Published by CBS Publishers and Distributers, 1984.*
2. *A. Mazur, and B. Harrows, Textbook of Biochemistry. W.B. Sanders Publications, 1971.*

Web Source:

1. <https://www.cerc.uga.edu/~mao/cellwall/main.htm>
2. <https://plantfacts.osu.edu/resources/hcs300/biochem2.htm>
3. <https://www.coursera.org/lecture/life-on-other-planets/amino-acids-to-proteins-2J7GY>
4. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Plant%20Biotechnology/GPBR311/Start%20to%20read%20the%20Course.html>

Open Learning Source:

1. <https://swayam.gov.in/courses/public>
2. <http://nptel.ac.in/course.php>



Syllabus
I Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO03	Fundamentals of Soil Science	2	-	2	4	3

Course Objectives:

1. To understand soil forming, soil profile and its components.
2. To gain knowledge on soil properties and its classification.
3. To gain technical knowledge about chemical properties of Soil
4. To understand about Soil colloids, composition and their influence on soil properties.
5. To gain knowledge about Humic substances, pollution and the behaviour of pesticides and inorganic contaminants.

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction of Soil

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

Unit-2:-Physical properties of Soil

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

Unit-3:- Chemical properties of Soil

Source, amount and flow of heat in soil; effect on plant growth, Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability.

Unit-4:- Soil colloids

Inorganic and organic; silicate clays: constitution and properties; sources of charge; ion exchange, cation exchange capacity, base saturation; soil organic matter: composition, properties and its influence on soil properties.

Unit-5:-Humic substances and pollution

Nature and properties; soil organisms: macro and micro organisms, their beneficial and harmful effects; Soil pollution - behaviour of pesticides and inorganic contaminants, prevention and mitigation of soil pollution.

Case Studies:

Optional

List of Practicals:

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

Project:

Optional.

Course Outcomes:

- A. Students will be familiarized with the importance of soils in agriculture
- B. Students will come to know the physical, chemical, biological aspects of soil and soil-water-plant interaction
- C. Student will come to know about the Chemical properties of Soil
- D. Students will know the Soil colloids, composition and their influence on soil properties.
- E. Student will know the Humic substances and pollution

Text Books:

1. Boul S.W., Hole R.D., McCracken and Southard R.J. (1998). *Soil genesis and classification Fourth Ed Panima Publishing corporation, New delhi.*
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. Mehra R.K. (2004) *Text book of Soil Science, ICAR, New Delhi*
7. Jackson, M.L. (1973) *Soil chemical analysis, Prentice Hall of India, Pvt. Ltd New Delhi*
8. Piper, C.S. (1950) *Soil and plant analysis. .Hans publications, Bombay*
9. Agarwal, R.R., Yadav, J.S.P. & Gupta, R.N. (1982) *Saline and alkali soils of India. ICAR, New Delhi.*
10. Sehgal, J. (2000) *Pedology: Concepts and applications, Kalyani publisher, Ludhiana*

Reference Books:

1. Richards, L.A. (1960) *Diagnosis and improvement of saline and alkali soils.*, USDA agriculture Hand book 60, Washington D.C., USA
2. Chopra S.L. and Kanwar, J.S. (1991) *Analytical Agricultural Chemistry*, Kalyani publisher, Ludhiana
- ISSS (2009) *Fundamentals of Soil Science*, Div. of Soil Science, IARI, New Delhi
3. Baver, L.D. Gardener, W.H. and gardener W.R.(1976) *Soil Physics* Wiley Eastern Ltd, New Delhi
4. Gupta, I.C. & Sharma, S.K. (1988) *Crop production in salt affected soils*, Oxford and IBH Publication, New Delhi.
5. Agarwal, R.R., Yadav, J.S.P. & Gupta, R.N. (1982) *Saline and alkali soils of India*. ICAR, New Delhi.

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Introduction%20to%20Soil%20Science/SSAC121/Start%20to%20read%20the%20Course.html>
2. <http://www.agriinfo.in/?page=topiclist&superid=4&catid=24>
3. http://agritech.tnau.ac.in/agriculture/agri_index.html

Open Learning Source:

1. <https://swayam.gov.in/courses/public>
2. <http://nptel.ac.in/course.php>
3. <http://ecoursesonline.iasri.res.in/Courses/Introduction%20to%20Soil%20Science/SSAC121/Start%20to%20read%20the%20Course.html>



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
I Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3MC01	Human Values & Ethics	1	-	0	2	2

Course Objectives:

1. To Understand the positive human behaviour and actions, in our daily life.
2. To learn to co-ordinate our actions and words to be aligned with our values.
3. To bring changes in behaviour towards positive thoughts.
4. To learn to promote peace and harmony in the society besides preserving our culture and heritage.
5. To understand relation between spirituality, values and ethics.

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction Values and Ethics

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

Unit-2:-Self Exploration

Self Exploration. Self-Awareness. Self-Satisfaction.

Unit-3:- Decision Making.

Decision Making. Motivation.Sensitivity. Success.

Unit-4:-Positive Spirit

Positive Spirit. Body, Mind andSoul.

Unit-5:-Spirituality Quotient

Attachment and Detachment. Spirituality Quotient. Examination.

Case Studies:

Optional

Project:

Optional.

Course Outcomes:

- A. Development of positive human behaviour and actions.
- B. A better and learned next young generation with high values.
- C. Better citizens with mind set for peace and harmony in the society.

D. Sensitized young generation to preserve our culture and heritage.

E. A young generation with high spirituality quotient.

Text Books:

1. *Human Value and Professional ethics- R.R. Gaur, R. Sangal and G.P. Bagaria*
2. *Foundation of ethics and management-excel book .*

Reference Books:

- A. *Human values- A.N. Tripathy- New age international publication*
- B. *Science and humanism- P.L. Dhar, R.R. Garg- Commonwealth pub;lisher*

Web Source:

1. https://www.researchgate.net/publication/307605712_Professional_Ethics_And_Human_Values
2. https://www.researchgate.net/publication/307605712_Professional_Ethics_And_Human_Values
3. https://www.researchgate.net/profile/Syed_Ibrahim15/publication/307605712_Professional_Ethics_And_Human_Values/links/57cd0d1d08aedb6d6d9ca9bd/Professional-Ethics-And-Human-Values.pdf

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://archive.swayam.gov.in/courses/public>



Syllabus
I Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO04	Introduction to Forestry	1	-	2	3	2

Course Objectives:

1. To understand Introduction of forestry
2. To gain complete knowledge about Artificial regeneration
3. To gain technical knowledge of Forest mensuration
4. To understand Instrumental methods of height measurement
5. To gain knowledge about Introduction of Agroforestry

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction of forestry

Introduction – definitions of basic terms related to forestry, objectives of silviculture, Crown classification. Tending operations – weeding, cleaning, thinning –mechanical, ordinary, crown and advance thinning. forest classification, salient features of Indian Forest Policies.

Unit-2 :-Forest regeneration

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

Unit-3:- Forest mensuration

Forest mensuration – objectives, diameter measurement, instruments used in diameter measurement; Non instrumental methods of height measurement - shadow and single pole method;

Unit-4:-Instrumental methods

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

Unit-5:-Agroforestry

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

Case Studies:

Optional

List of Practicals:

1. Identification of tree-species.
2. Diameter measurements using callipers and tape,
3. Diameter measurements of forked, buttressed, fluted and leaning trees.

4. Height measurement of standing trees by shadow method, single pole method and hypsometer.
5. Volume measurement of logs using various formulae.
6. Nursery lay out, seed sowing, vegetative propagation techniques.
7. Forest plantations and their management.
8. Visits of nearby forest-based industries.

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized with the Introduction of forestry
- B. Student will come to know about Artificial regeneration
- C. Student will come to know about the Forest mensuration
- D. Student will know the Instrumental methods of height measurement
- E. Student will come to know about Agroforestry

Text Books:

1. *Indian forestry K. manikandan and s. prabhuJain Brothers; Sixth Edition 2018 edition*
3. *A text book of Agroforestry S.S. Negi*

Reference Books:

- A. *plantation tree R.K. Luna International Book Distributors, 1996*
- B. *principal and practise of silviculture A.P.Dwivedi Oxford &Ibh Publishing Company, 1992*

Web Source:

1. http://agritech.tnau.ac.in/forestry/forest_index.html
2. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=14669>
3. <http://vikaspedia.in/agriculture/forestry>

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/courses/126105013/#s>



Syllabus
I Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3RC01	Introductory Biology	1	-	2	3	2

Course Objectives:

1. To study the basic knowledge of biology.
2. To understand Binomial nomenclature
3. To study morphology of flowers.
4. To gain knowledge about Plant systematic
5. To understand Role of animals in agriculture.

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction to Biology

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

Unit-2:-Binomial nomenclature

Binomial nomenclature and classification Cell and cell division.

Unit-3:-Morphology of flowering plants.

Morphology of flowering plants. Seed and seed germination.

Unit-4:-Plant systematic

Plant systematic- viz; Brassicaceae, Fabaceae and Poaceae.

Unit-5:-Animals in agriculture

Role of animals in agriculture.

Case Studies:

Optional

List of Practicals:

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

Project:

Optional.

Course Outcomes:

- A. The student will be able to demonstrate knowledge of the biology.
- B. The student will be able to understand Binomial nomenclature
- C. The student will be able to understand different morphology of the flowers.
- D. The student will be able to know about the Plant systematic
- E. Student will come to know about Role of animals in agriculture

Text Books:

1. *Fundamentals of Genetics*, B. D. Singh, Kalyani Publishers, latest edition
2. *Elements of Genetics*, Phundan Singh, Kalyani Publishers, latest edition
3. *Genetics*, P. K. Gupta, Rastogi Publications, 5th Revised Edition, , latest edition
4. *NCERT books* , class 11th and 12th.

Reference Books:

- A. *Plant Breeding- Principles & Methods*, B. D. Singh, Kalyani Publishers / Lyall Bk Depot, , latest edition
- B. *Seed Technolog*, DhirendraKharE, M. S. Bhale, Scientific Publishers Journals Dept, 2nd revised & enlarged edition, , latest edition

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Genetics/GBPR111/Start%20to%20read%20the%20Course.html>
2. <http://www.biologydiscussion.com/heredity/pre-mendelian-and-post-mendelian-concepts-of-heredity/15403>

Open Learning Source:

1. <https://swayam.gov.in/courses/public>
2. <http://nptel.ac.in/course.php>
3. http://agritech.tnau.ac.in/agriculture/agri_weedmgt.html
4. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Genetics/GBPR111/Start%20to%20read%20the%20Course.html>
5. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Seed%20Technology/GPB R112/Start%20to%20read%20the%20Course.html>



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
I Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO06	Rural Sociology & Educational Psychology	2	-	0	2	2

Course Objectives:

1. To understand Sociology and Rural sociology
2. To gain complete knowledge about Social Ecology
3. To gain knowledge of Social Institution
4. To understand Educational psychology
5. To gain knowledge about Theories of Motivation

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-introduction of Sociology and Rural sociology

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

Unit-2:-Social Ecology

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

Unit-3:- Social Institution

Culture concept, Social Institution, Social Change & Development

Unit-4:-Educational psychology

Educational psychology: Meaning & its importance in agriculture extension.

Unit-5:-Theories of Motivation

Behaviour: Cognitive, affective, psychomotor domain, personality, Learning, Motivation, Theories of Motivation, Intelligence.

Case Studies:

Optional

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized with the importance of Sociology and Rural sociology
- B. Student will come to know about Social Ecology
- C. Student will come to know about the Social Institution

D. Student will know the Educational psychology

E. Student will come to know about Theories of Motivation

Text Books:

1. Chitambar, J.B. 1973. Introductory rural sociology. New York, John Wiley and Sons.
2. Desai, A.R. 1978. Rural sociology in India. Bombay, Popular Prakashan, 5th Rev. ed.
3. Doshi, S.L. 2007. Rural sociology. Rawat Publishers, Delhi.
4. Sharma, K.L. 1997. Rural society in India. Rawat Publishers, Delhi.
5. Bhushan, V. and Sachdeva, D.R. 2010. An introduction to Sociology, Kitab Mahal, New Delhi.
6. Mondal, S. 2014. Text Book of Rural Sociology and Educational Psychology. Kalyani Publishers, New Delhi.

Reference Books:

- A. Sharma O. P. and Somani L. L. 2012. Fundamentals of Rural Sociology and Educational Psychology. Agrotech Pub. Co., Udaipur
- B. Maslow, A.H. 1970. Motivation and personality. Harper and Row publishers, New York.
- C. Pujari, D. 2002. Educational Psychology in Agriculture, Agrotech Publishing Academy, Udaipur (Raj.)
- D. Jayapalan, N. 2002. Rural sociology. Altanic Publishers, New Delhi.
- E. Bhatia, H.R. 1965. A Text Book of Educational Psychology, Asia Publishing House, New Delhi.

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Fundamentals%20of%20Rural%20&%20Educational%20Psychology/AEXT391/Start%20to%20read%20the%20Course.html>
2. http://agritech.tnau.ac.in/agriculture/agri_index.html
3. <http://vikaspedia.in/agriculture>
4. <https://agriinfo.in/extension/25/>

Open Learning Source:

- 1 <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/course.php>

Medi-Caps University, Indore
Faculty of Agriculture
Model New Scheme as per Medi-Caps University

First Year (Even Semester - II Sem)						
Sr. No.	Subject Code	Courses	L	T	P	Credit
1	AG3CO07	Fundamentals of Genetics	2	0	1	3
2	AG3CO08	Agricultural Microbiology	1	0	1	2
3	AG3CO09	Soil and Water Conservation Engineering	1	0	1	2
4	AG3CO10	Fundamentals of Crop Physiology	1	0	1	2
5	AG3CO11	Fundamentals of Agricultural Economics	2	0	0	2
6	AG3CO12	Fundamentals of Plant Pathology	3	0	1	4
7	AG3CO13	Fundamentals of Entomology	3	0	1	4
8	AG3CO14	Fundamentals of Agricultural Extension Education	2	0	1	3
9	AG3SE02	Communication Skills and Personality Development	1	0	1	2
10	AG3MC01	Human Values & Ethics	1	0	0	1
		Total	17	0	8	25



Syllabus
II Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO08	Agricultural Microbiology	1	-	2	3	2

Course Objectives:

1. To attain knowledge about introduction to cells
2. To know about bacterial genetics
3. To understand about microbes
4. To study about biological nitrogen fixation
5. To gain importance of microbes in human welfare

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction

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

Unit-2:-Bacterial genetics

Genetic recombination transformation, conjugation and transduction, plasmids, transposon.

Unit-3:- Microbes

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

Unit-4:-Biological nitrogen fixation

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

Unit-5:-Microbes in human welfare

Silage production, biofertilizers, biopesticides, biofuel production and biodegradation of agro-waste.

Case Studies:

Optional

List of Practicals:

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

9. Isolation of *Azospirillum* from roots.
10. Isolation of BGA.
11. Staining and microscopic examination of microbes.

Project:

Optional.

Course Outcomes:

- A. The students will be able to know about introduction to cells
- B. The students will gain the knowledge of bacterial genetics
- C. The students will understand about microbes
- D. The students will study about biological nitrogen fixation
- E. The students will gain importance of microbes in human welfare

Text Books:

1. I. Biswas, T.D. and Mukherjee, S.K. 1990. *Text Book of Soil Sciences*, Tata McGrawHill Publishing Company Limited, New Delhi.
2. Mukherjee, N. and Ghosh T. 1998. *Agricultural Microbiology*, Kalyani Publishers, New Delhi.
3. Rangaswami, G. and Bagyaraj, D.J. 2010. *IInd ed. Agricultural Microbiology*. Prentice Hall of India Pvt. Limited, New Delhi.
4. R.P. Singh , 2013. *Plant Pathology*. Kalyani Publishers

Reference Books:

1. Mehrotra, R.S. and Agarawal, A. 2012. *I2th ed. Plant Pathology*. Tata McGraw Hill Publishing Co. Ltd., New Delhi
2. Rao, N.S. 2000. *Soil Microbiology*, Oxford & IBH Publishing Co.Pvt.Ltd., New Delhi.
3. Vishunavat, K. and Kolte, S.J. 2005. *Essentials of Phytopathological Techniques*. Kalyani Publishers, New Delhi

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Agricultural%20Microbiology/AMBE101/Start%20to%20read%20the%20Course.html>
2. <http://vikaspedia.in/agriculture>
3. <http://agritech.tnau.ac.in/>
4. <http://kiran.nic.in/>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



Syllabus
II Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3SE02	Communication Skills and Personality Development	1	-	2	3	2

Course Objectives:

1. To develop communication skill of the students
2. To understand verbal and nonverbal communication
3. To understand and bibliographic procedures in communication
4. To understand Reading and comprehension of general and technical articles
5. To develop the personality of the student.

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction

Communication Skills: Structural and functional grammar; meaning and process of communication

Unit-2:-Communication

verbal and nonverbal communication; listening and note taking, writing skills, oral presentation skills

Unit-3:- Record

field diary and lab record; indexing, footnote and bibliographic procedures.

Unit-4:-Reading and comprehension

Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations,

Unit-5:-Public speaking;

Impromptu presentation, public speaking; Group discussion. Organizing seminars and conferences.

Case Studies:

Optional

List of Practicals:

1. Listening and note taking, writing skills,
2. Oral presentation skills; field diary and lab record
3. Indexing, footnote and bibliographic procedures.
4. Reading and comprehension of general and technical articles,
5. Precise writing, summarizing, abstracting; individual and group presentations.

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized with the communication skill
- B. Student will be familiarized with verbal and nonverbal communication
- C. Students will easily understand the bibliographic procedures
- D. Students are able to understand **Reading and comprehension**
- E. Improvement of personality

Text Books:

1. Sandhu, A. S. (1999). Textbook on Agricultural Communication; process and methods oxford RIBH Publishing co. Pvt. Ltd. New Delhi.
2. Dahama, O. P. and Bhatnagar, O.P., 1998, *Education and Communication for Development*, Oxford and IBH publishing Co. Pvt. Ltd., New Delhi.
3. Jalihal, K. A. and Veerabhadraiah, V., 2007, *Fundamentals of Extension Education and Management in Extension*, Concept publishing company, New Delhi.
4. Ray, G. L., 1991 (1st Edition), *Extension Communication and Management*, Kalyani Publishers, Ludhiana {7th revised edition - 2010}.,

Reference Books:

1. Sharma R C and Krishna Mohan. 1978. *Business Correspondence*. Tata Mc Graw Hill
2. Supe, S. V., 2013 (2nd Edition), *A Text Book of Extension Education*, Agrotech Publishing Academy, Udaipur.
3. Berlo, David K. (1960). *The process of Communication*. NwYark, Holt, Rinehart and Winston Inc.
4. Mohan Krishna and Meera Banerjee. 1990. *Developing Communication Skills*. Macmillan India Ltd. New Delhi.

Web Source:**Open Learning Source:**



Syllabus
II Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO11	Fundamentals of Agricultural Economics	2	-	0	2	2

Course Objectives:

1. To understand the theories and concepts of agricultural economics.
2. To develop the understanding of consumer behaviour.
3. To make understand the various cost curves and production function.
4. To enable the students about various market structures and price determination.
5. To develop the analytical insight among the students about the national income, inflation and problems of agricultural credit in India.

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction to Economics:

Meaning, definition & scope of economics, fundamental nature of economics, micro and macro economics, Agricultural economics: meaning, definition and characteristics of agricultural economics, role of agriculture in Indian economy, agriculture development in five year plans.

Unit- 2:-Consumer Behaviour and Demand Analysis:

Cardinal utility approach- law of diminishing marginal utility, ordinal utility approach-indifference curve analysis & characteristics, marginal rate of substitution, concept of demand and its determinants, law of demand, concept and measurement of elasticity of demand, types of elasticity of demand- price, income & cross.

Unit-3:- Cost Curves Analysis and Production Function:

The concept of cost and types of costs, costs in long run and short run. The concept of revenue-total revenue, average revenue, marginal revenue and relationship between marginal revenue and average revenue, production function- law of variable proportions, law of returns to scale, law of supply, price elasticity of supply.

Unit-4:-Market Structure and Pricing:

Meaning, definition & features of perfect competition, monopolistic competition and monopoly, price and output determination under perfect competition; short run and long run equilibrium of firm and industry, shut down & break even points, price and output determination under monopolistic competition and monopoly.

Unit-5:-Distribution theory, National income & Agricultural Credit:

Meaning and definition of rent and wages, various theories of rent and wages, National income: Meaning and definition of national income, meaning and definition of inflation, types of inflation, impact of inflation, need of agricultural finance, problems of agricultural credit in India,

Case Studies:

Optional

Project:

Optional.

Course Outcomes:

- A. Students will have the in-depth knowledge of theories and concepts of agricultural economics.
- B. Students will understand the consumer behavior and able to prepare proper policy for consumers.
- C. Students will understand the cost concepts and production function to decrease the cost.
- D. Students will understand the various market structures and price determination to make a appropriate pricing policy.
- E. After having the acquaintance of agricultural economics students will able to take significant agricultural decisions.

Text Books:

1. *S. Subba Reddy, P Raghu Ram, T. V. NeelakantaSastry and I. Bhawani Devi- Agricultural Economcis, Oxford & IBH publishing Co. Pvt. Ltd., New Delhi*
2. *A. Koutsoyiannis – Modern Micro Economics, Macmillan Press, New Delhi, IInd Edition*
3. *Hal Varian – Intermediate micro economics, Tata McGraw Hills, New Delhi*

Reference Books:

- A. *David L. Debertin, Agricultural Production Economics, Macmillan Publishing Company*
- B. *P.Samuelsson, “Foundation of Economics Analysis”, Harvard University Press, IInd Edition.*
- C. *Dominick Salvatore, Principles of Microeconomics, Oxford.*
- D. *Rudiger DORNBUSCH, Macro Economics, Mc Graw Hill Education*

Web Source:

1. <http://www.economicdiscussion.net/agricultural-economics/agricultural-economics-meaning-scope-and-nature/21406>
2. <https://agriinfo.in/economic/>

Open Learning Source:

1. <https://swayam.gov.in/courses/public>
2. <http://nptel.ac.in/course.php>
3. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Agronomy%20&%20agrcrlrl%20Meteorology/AGRO101/Start%20to%20read%20the%20Course.html>



Syllabus
II Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO14	Fundamentals of Agricultural Extension Education	2	-	2	4	3

Course Objectives:

1. To attain knowledge about extension and education
2. To know about various extension programmes in India
3. To understand about various rural and community development
4. To study about Monitoring evaluation and extension teaching methods
5. To gain importance of communication and journalism

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Education And Extension

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

Unit- 2:-Extension Programmes In India

Extension systems in India- extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era (IADP, IAAP, HYVP, KVK etc.) various extension/ agriculture development programmes launched by ICAR/ Govt. of India .New trends in agriculture extension, Privatization extension-cyber extension/ e-extension, market-led extension, farmer-led extension..

Unit-3:- Rural And Community Development

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

Unit-4:-Monitoring Evaluation And Extension Teaching Methods

Monitoring evaluation- concept and definition, extension teaching methods; meaning, classification, individual, group and mass contact methods, ICT Applications in TOT (New and Social Media)

Unit-5:-Communication And JournalismCommunication: meaning and definition; Principles and Functions of Communication, models and barriers to communication. Agriculture journalism- diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories.

Case Studies:

Optional

List of Practicals:

1. To get acquainted with university extension system.
2. Handling and use of audio visual equipments and digital camera and LCD projector; preparation and use of AV aids.
3. Preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories.
4. Presentation skills exercise-micro teaching exercise
5. A visit to village to understand the problems being encountered by the village farmers.
6. To study organization and functioning of DRDA and other development departments at district level.
7. Visit to NGO and learning from their experience in rural development.
8. Script writing, writing for print and electronic media, developing script for radio and television.

Project:

Optional.

Course Outcomes:

- A. The students will be able to know about extension and education
- B. The students will gain the knowledge of various extension programmes in India
- C. The students will understand about various rural and community development
- D. The students will study about Monitoring evaluation and extension teaching methods
- E. The students will gain importance of communication and journalism

Text Books:

1. *Extension Communication and management*, G.L.Ray, NayaPrakashan Publishers, kolkata latest edition
2. *Education and communication for development*, O.P.Dhama and O.P. Bhatnagar oxford and I.B.H. publications, New Delhi, latest edition
3. *Communication and extension management*, Jitendra Chauhan, Anjali Prakashan, latest edition

Reference Books:

- F. *Agriculture extension and rural development*, D. Singh and B.k.Singh, Narendra publishing house, delhi, latest edition
- G. *Fundamentals of agricultural extension*, U.Burman, R.K. Talukdar, Agrobios publications jodhpur, latest edition

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Dimensions%20of%20Agriculture%20Extension/AEXT191/Start%20to%20read%20the%20Course.html>
2. <https://www.agriinfo.in/default.aspx?page=topiclist&superid=7&catid=41>

Open Learning Source:

1. <https://www.agmoocs.in/content/fundamentals-agricultural-extension>
2. <https://nptel.ac.in/course.php>



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
II Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO10	Fundamentals of Crop Physiology	1	-	2	3	2

Course Objectives:

1. To attain knowledge about crop physiology
2. To know about Nutrition of Plants
3. To understand about Photosynthesis
4. To study about Plant growth regulators
5. To gain importance of Growth and development

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Cellular Physiology

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

Unit-2:- Growth and development

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

Unit-3:- Photosynthetic and Respiratory pathways

Photosynthesis: Light and Dark reactions, C₃, C₄ and CAM plants; Respiration: Glycolysis, TCA cycle and electron transport chain;

Unit-4:- Fatty acid metabolism and Plant growth regulators

Fat Metabolism: Fatty acid synthesis and Breakdown; Plant growth regulators: Physiological roles and agricultural uses,

Unit-5:- Nutrition of Plants

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

Case Studies:

Optional

List of Practicals:

1. Study of plant cells,
2. structure and distribution of stomata,
3. Imbibitions, osmosis, plasmolysis,
4. measurement of root pressure, rate of transpiration,
5. Separation of photosynthetic pigments through paper chromatography,
6. Rate of transpiration, photosynthesis, respiration, tissue test 105for mineral nutrients,
7. Estimation of relative water content, Measurement of photosynthetic CO₂
8. Assimilation by Infra-Red Gas Analyser (IRGA).

Project:

Optional.

Course Outcomes:

- A. The students will be able to know about crop physiology
- B. The students will gain the knowledge of Nutrition of Plants
- C. The students will understand about Photosynthesis
- D. The students will study about Plant growth regulators
- E. The students will gain importance of Growth and development

Text Books:

1. N. K. Gupta & Sunita Gupta, 2004. *Plant Physiology*. Oxford and IBH publication, New Delhi.
2. S. N. Pandey and B. K. Sinha (1995). *Vikas Publishing House Pvt. Ltd., new Delhi*

Reference Books:

- H. J. B. Salisbury and C.W. Ross (1992). *Plant Physiology*, Wadswar Publishing Company, Belmont, California
- I. L. Taiz and E. Zieger (2006). *Plant Physiology*. 4th Ed. Sinauer Associates.

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Crop%20Physiology/PPHY261/Start%20to%20read%20the%20Course.html>
2. <http://agritech.tnau.ac.in/>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>





मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
II Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO13	Fundamentals of Entomology	3	-	2	5	4

Course Objectives:

1. To understand Insect morphology
2. To gain complete knowledge about Insect Ecology
3. To gain technical knowledge of IPM
4. To understand Insect repellents and antifeedants chemicals
5. To gain knowledge about Insect taxonomy

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction and classification of insects

History of Entomology in India. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda up to classes. Relationship of class Insecta with other classes of Arthropoda. Body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, type of Wings. Structure of male and female genital organ.

Unit-2:-Insect Ecology

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

Unit-3:- IPM

Categories of pests. Concept of IPM, Practices, scope and limitations of IPM. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Chemical control importance, hazards and limitations.

Unit-4:-Insect repellents and antifeedants chemicals

Recent methods of pest control, repellents, anti feed ants, hormones, attractants, gamma radiation. Insecticides Act 1968- Important provisions. Application techniques of spray fluids. Symptoms of poisoning, first aid and antidotes.

Unit-5:-Insect taxonomy

Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta upto Orders.

Case Studies:

Optional

List of Practicals:

1. Methods of collection of insects including immature stages;
2. Methods of preservation of insects including immature stages;
3. External features of Grasshopper/Cockroach
4. Types of insect antennae, mouthparts and legs
5. Wing venation, types of wings and wing coupling apparatus.
6. Types of insect larvae and pupae;
7. Dissection of digestive system in insects (Grasshopper)
8. Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera

Project:

Optional.

Course Outcomes:

- A. The students will be able to know about Insect morphology
- B. The students will gain the knowledge of Insect Ecology
- C. The students will understand about IPM
- D. The students will study about Insect repellents and antifeedants chemicals
- E. The students will gain the knowledge about Insect taxonomy

Text Books:

1. Chapman .R.F.1981. Insect Structure and Function, ELBS Publishers New Delhi.
2. Mathur and Upadhyay, 2005. A Text Book of Entomology, Aman Publishing House, Meerut.
3. Pant. N.C. and Ghai, S. 1981. Insect Physiology and Anatomy, ICAR, New Delhi.
4. Richards O.W. and Davies R.G. 1977. Imm's General Text Book of Entomology, Vol.I & II. Chapman and Hall, London.

Reference Books:

- J. Snodgrass R.E .2001. Principles of Insect Morphology, CBS Publishers and Distributors, New Delhi.
- K. David B.V. and Ananthkrishnan .T.N. 2003. General and Applied Entomology, 2nd Ed. Mc graw Hill publishing Co. Ltd. New Delhi.

Web Source:

1. <http://ecoursesonline.iasri.res.in/course/view.php?id=142>
2. <http://eagri.org/eagri50/ENTO231/lec01.pdf>
3. <http://www.agrilance.com/entomology/index.php/2017/12/08/angru-notes/>

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/course.php>



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Syllabus
II Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO07	Fundamentals of Genetics	2	-	2	4	3

Course Objectives:

1. To understand Mendelian concepts of heredity.
2. To gain complete knowledge about mitosis and meiosis.
3. To understand Sex determination and sex linkage.
4. To understand the Mutation.
5. To understand the fundamental of Genetic disorders and Gene concept.

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Mendelian principles and chromosome structure

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

Unit- 2:- Cell division and gene interactions

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

Unit-3:-Sex determination, Chromosome mapping and variation

Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanisms, chromosome mapping. Structural and numerical variations in chromosome and their implications, Use of haploids, dihaploids and doubled haploids in Genetics.

Unit-4:-Mutation, multiple factor hypothesis and cytoplasmic inheritance

Mutation, classification, Methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation. Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance.

Unit-5:- Genetic material and Gene concept

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

Case Studies:

Optional

List of Practicals:

1. Study of microscope.
2. Study of cell structure.
3. Mitosis and Meiosis cell division.
4. Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross,
5. Experiments on epistatic interactions including test cross and back cross,
6. Practice on mitotic and meiotic cell division, Experiments on probability and Chi-square test.
7. Determination of linkage and cross-over analysis (through two point test cross and three point test cross data).
8. Study on sex linked inheritance in *Drosophila*.
9. Study of models on DNA and RNA structures.

Project:

Optional.

Course Outcomes:

- A. The student will be able to demonstrate knowledge of the basic principles of Mendelian genetics.
- B. The student will be able to evaluate mitosis and meiosis.
- C. Student will come to know about the Sex determination
- D. The student will be able to knowledge of the Mutation
- E. Student will come to know Genetic disorders and Gene concept.

Text Books:

1. *Fundamentals of Genetics*, B. D. Singh, Kalyani Publishers, latest edition
2. *Elements of Genetics*, Phundan Singh, Kalyani Publishers, latest edition
3. *Genetics*, P. K. Gupta, Rastogi Publications, 5th Revised Edition, , latest edition

Reference Books:

- L. *Plant Breeding- Principles & Methods*, B. D. Singh, Kalyani Publishers / Lyall Bk Depot, , latest edition
- M. *Seed Technolog*, DhirendraKharE, M. S. Bhale, Scientific Publishers Journals Dept, 2nd revised & enlarged edition, , latest edition
- N. *Crop Breeding and Biotechnology*, Hari Har Ram, Kalyani Publishers, , latest edition

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Genetics/GBPR111/Start%20to%20read%20the%20Course.html>
2. <http://www.biologydiscussion.com/heredity/pre-mendelian-and-post-mendelian-concepts-of-heredity/15403>

Open Learning Source:

1. <https://swayam.gov.in/courses/public>
2. <http://nptel.ac.in/course.php>
3. http://agritech.tnau.ac.in/agriculture/agri_weedmgmt.html
4. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Genetics/GBPR111/Start%20to%20read%20the%20Course.html>



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Medi-Caps University, Indore

Syllabus
II Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO12	Fundamentals of Plant Pathology	3	-	2	5	4

Course Objectives:

1. To understand the symptoms and signs of plant diseases.
2. To understand the students with general characteristics of fungi and fungal-like organisms causing plant diseases.
3. To identify the general characteristics of fungi, bacteria, virus, viroid and nematodes.
4. To understand dispersal and survival of plant pathogens.
5. To gain knowledge about Epidemiology

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction to plant pathology

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

Unit- 2:-Mycology

General characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction (asexual and sexual). Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to divisions, sub-divisions, orders and classes.

Unit-3:- Plant bacteriology, virology and nematology

Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction. Viruses: nature, structure, replication and transmission. Study of

phanerogamic plant parasites. Nematodes: General morphology and reproduction, classification, symptoms and nature of damage caused by plant nematodes (Heterodera, Meloidogyne, Anguina, Radopholus etc.)

Unit-4:-Dispersal and survival of plant pathogens

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

Unit-5:-Epidemiology

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

Case Studies: Case Studies:

Importance of plant diseases- Brief mention of Important epidemics of international importance – Irish Famine (1845), Bengal Famine (1942), Coffee rust (1868), Wheat Rust (1940), Southern Corn Leaf blight in USA

Optional

List of Practicals:

1. Acquaintance with various laboratory equipment.
2. Microscopy - study of the parts of microscope.
3. Demonstration of mechanical transmission of plant viruses.
4. Study of morphological features and identification of plant parasitic nematodes.
5. Preparation of culture media Potato Dextrose Agar (PDA) for fungi and Nutrient Agar (NA) for bacteria.
6. Preservation of disease samples - dry and wet methods.
7. Demonstration of Koch's postulates for fungi.
8. Demonstration of Koch's postulates for bacteria.
9. Study of different groups of fungicides and antibiotics.
10. Preparation of fungicides - Bordeaux mixture, Bordeaux paste and cheshnut Compound.
11. Methods of application of fungicides - soil application.
12. Methods of application of fungicides - seed treatment.
13. Foliar application of fungicides - Calculation of fungicide spray concentrations.
14. Pesticide equipment and their safe use.

Project:

Optional.

Course Outcomes:

- A. Students will know about concept of disease, pathogen of plant diseases, identification methods and crop diseases management.
- B. Students will know about disease symptoms and disease characteristics.
- C. Students will know about plant fungi, bacteria, virus, viriod and nematodes.
- D. Students will know the survival of plant pathogens and defense mechanism of plants.

Text Books:

1. *Introduction to Principles of Plant Pathology*, R. S. Singh, Oxford, latest edition
2. *Plant Pathology*, R. S. Mehrotra, Tata McGraw-Hill Education, latest edition

Reference Books:

- O. *Plant Pathology*, R.P. Singh, Kalyani Publishers, latest edition.
- P. *Plant Pathology*, B.P. Pandey, S. Chand & Company Ltd, latest edition.
- Q. *Plant Pathogens : The Fungi* - R. S. Singh, Oxford & IBH Publishing Co., latest edition
- R. *An Introduction to Fungi*-H. C. Dube, Scientific Publishers, latest edition
- S. *Introductory Mycology*, D. P. Tripathi, Kalyani Publishers / Lyall Bk Depot, latest edition

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Plant%20Pathogens%20&%20Principles%20of%20Plant%20Pathology/PATH171/Start%20to%20read%20the%20Course.html>
2. <http://eagri.org/eagri50/PATH171/lec03.pdf>
3. <http://www.agriinfo.in/default.aspx?page=topic&superid=5&topicid=1986>

Open Learning Source:

1. <https://swayam.gov.in/courses/public>
2. <http://nptel.ac.in/course.php>
3. <http://ecoursesonline.iasri.res.in/Courses/Plant%20Pathogens%20&%20Principles%20of%20Plant%20Pathology/PATH171/Start%20to%20read%20the%20Course.html>



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Syllabus
II Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO09	Soil and Water Conservation Engineering	1	-	2	3	2

Course Objectives:

1. To understand soil and water conservation.
2. To gain complete knowledge about water erosion.
3. To gain technical knowledge of mechanical measurement practices of soil water conservation.
4. To understand water harvesting techniques.
5. To gain knowledge about wind erosion its principles and control measures.

Prerequisites :12th pass

Co-requisites: Nil

Curriculum:

Unit-1:-Introduction of soil & water conservation

Introduction to Soil and Water Conservation, causes of soil erosion. Definition and agents of soil erosion.

Unit-2:-Water erosion

Water erosion: Forms of water erosion. Gully classification and control measures. Soil loss estimation by universal Loss Soil Equation. Soil loss measurement techniques.

Unit-3:- Mechanical measures

Principles of erosion control: Introduction to contouring, strip cropping. Contour bund. Graded bund and bench terracing.

Unit-4:-Water harvesting

Grassed water ways and their design. Water harvesting and its techniques.

Unit-5:-Wind erosion

Wind erosion: mechanics of wind erosion, types of soil movement. Principles of wind erosion control and its control measures.

Case Studies:

Optional

List of Practicals:

1. General status of soil conservation in India..
2. Calculation of erosion index.
3. Estimation of soil loss.
4. Measurement of soil loss.
5. Preparation of contour maps.
6. Design of grassed water ways.
7. Design of contour bunds.
8. Design of graded bunds.
9. Design of bench terracing system.
10. Problem on wind erosion

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized with the importance of soil water conservation in Agriculture
- B. Student will come to know about water erosion.
- C. Student will come to know about the mechanical measures of checking erosion.
- D. Student will know the water harvesting techniques.
- E. Student will come to know about wind erosion.

Text Books:

1. *A.M. Michael, and T.P. Ojha, Principles of Agriculture Engineering, Vol. II Jain Brothers, New Delhi latest edition*
2. *S. C. Mahnot, P. K. Singh, and P. C. Chaplot, Soil and Water Conservation & Watershed Management, Apex Publication House, Udaipur.latest edition*
3. *B. C. Mal, Introduction to Soil and Water Conservation Engineering, Kalyani Publishers, New Delhi. latest edition*
4. *V.V.N. Murty, Madan K. Jha, Land and Water Management Engineering, Kalyani Publishers, New Delhi. latest edition*

Reference Books:

- A. *R. Suresh, Soil and Water Conservation Engineering, Standard Publishers distributors, Delhi latest edition*
- B. *G. Das, Hydrology and Soil Conservation Engineering, PHI Learning Private Limited, New Delhi latest edition*
- C. *S.Kumar, V.Kumar and R.K. Sahu, Fundamental of Agricultural Engineering. Kalyani Publishers, New Delhi. latest edition*
- D. *O.P. Singhal, Principles of Agriculture Engineering, Aman publishing House, Meerut (UP). latest edition*

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Fundamental%20of%20Soil%20Water%20Conservation%20%20&%20Eng/AENG151/Start%20to%20read%20the%20Course.html>
2. <https://www.agriinfo.in/default.aspx?page=topiclist&superid=8&catid=17>
3. <http://vikaspedia.in/agriculture>
4. <http://agritech.tnau.ac.in/>

Open Learning Source:

1. https://onlinecourses.nptel.ac.in/noc18_ar09/preview



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Medi-Caps University, Indore

Syllabus

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3MC03	NCC (National Cadet Corps)	0	-	4	4	2

Semester I: National Cadet Corps

1. Aims, objectives, organization of NCC and NCC song. DG's cardinals of discipline.
2. Drill- aim, general words of command, attention, stands at ease, stand easy and turning.
3. Sizing, numbering, forming in three ranks, open and close order march and dressing.
4. Saluting at the halt, getting on parade, dismissing and falling out.
5. Marching, length of pace, and time of marching in quick/slow time and halt. Side pace, pace forward and to the rear.
6. Turning on the march and wheeling. Saluting on the march.
7. Marking time, forward march and halt.
8. Changing step, formation of squad and squad drill.
9. Command and control, organization, badges of rank, honours and awards
10. Nation Building- cultural heritage, religions, traditions and customs of India. National integration.
11. Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizen.
12. Leadership traits, types of leadership. Character/personality development.
13. Civil defense organization, types of emergencies, firefighting, protection,
14. Maintenance of essential services, disaster management, aid during development projects.
15. Basics of social service, weaker sections of society and their needs, NGO's and their contribution, contribution of youth towards social welfare and family planning.
16. Structure and function of human body, diet and exercise, hygiene and sanitation.
17. Preventable diseases including AIDS, safe blood donation, first aid, physical and mental health.
18. Adventure activities
19. Basic principles of ecology, environmental conservation, pollution and its control.
20. Precaution and general behaviour of girl cadets, prevention of untoward incidents, vulnerable parts of the body, self defense.

Semester II: National Cadet Corps

1. Arms Drill- Attention, stand at ease, stand easy. Getting on parade. Dismissing and falling out. Ground/take up arms, examine arms.
2. Shoulder from the order and vice-versa, present from the order and vice-versa.
3. Saluting at the shoulder at the halt and on the march. Short/long trail from the order and viceversa.
4. Guard mounting, guard of honour, Platoon/Coy Drill.
5. Characteristics of rifle (.22/.303/SLR), ammunition, fire power, stripping, assembling, care, cleaning and sight setting.
6. Loading, cocking and unloading. Te lying position and holding.

7. Trigger control and firing a shot. Range Procedure and safety precautions. Aiming and alteration of sight.
8. Theory of groups and snap shooting. Firing at moving targets. Miniature range firing.
9. Characteristics of Carbine and LMG.
10. Introduction to map, scales and conventional signs. Topographical forms and technical terms.
11. The grid system. Relief, contours and gradients. Cardinal points and finding north. Types of bearings and use of service protractor.
12. Prismatic compass and its use. Setting a map, finding north and own position. Map to ground and ground to map.
13. Knots and lashings, Camouflage and concealment, Explosives and IEDs.
14. Field defenses obstacles, mines and mine laying. Bridging, waterman ship
15. Field water supplies, tracks and their construction.
16. Nuclear, Chemical and Biological Warfare (NCBW)
17. Judging distance. Description of ground and indication of landmarks.
18. Recognition and description of target. Observation and concealment. Field signals. Section formations.
19. Fire control orders. Fire and movement. Movement with/without arms. Section battle drill.
20. Types of communication, media, latest trends and developments.



Syllabus

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3MC02	NSS	0	-	4	4	2

Course aims at evoking social consciousness among students through various activities viz., working together, constructive and creative social work, to be skilful in executing democratic leadership, developing skill in programme development to be able for self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

Following activities are to be taken up under the NSS course:

Introduction and basic components of NSS: Orientation

- NSS programmes and activities
- Understanding youth
- Community mobilisation
- Social harmony and national integration
- Volunteerism and shramdan
- Citizenship, constitution and human rights
- Family and society
- Importance and role of youth leadership
- Life competencies
- Youth development programmes
- Health, hygiene and sanitation
- Youth health, lifestyle, HIV AIDS and first aid
- Youth and yoga
- Vocational skill development
- Issues related environment
- Disaster management
- Entrepreneurship development
- Formulation of production oriented project
- Documentation and data reporting
- Resource mobilization
- Additional life skills
- Activities directed by the Central and State Government

All the activities related to the National Service Scheme course is distributed under four different courses viz., National Service Scheme I, National Service Scheme II, National Service Scheme III and National Service Scheme IV each having one credit load. The entire four courses should be offered continuously for two years. A student enrolled in NSS course should put in at least 60 hours of social work in different activities in a semester other than five regular one day camp in a year and one special camp for duration of 7 days at any semester break period in the two year. Different activities will include orientation lectures and practical works. Activities directed by the Central and State Government have to be performed by all the volunteers of NSS as per direction.

Semester 1

Course Title: National Service Scheme I

Introduction and basic components of NSS:

Orientation:

history, objectives, principles, symbol, badge; regular programmes under NSS organizational structure of NSS, code of conduct for NSS volunteers, points to be considered by NSS volunteers awareness about health

NSS programmes and activities:

Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analysing guiding financial patterns of scheme, youth programme/ schemes of GOI, coordination with different agencies and maintenance of diary

Understanding youth

Definition, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change

Community mobilisation

Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilisation involving youth-adult partnership

Social harmony and national integration

Indian history and culture, role of youth in nation building, conflict resolution and peacebuilding

Volunteerism and shramdan

Indian tradition of volunteerism, its need, importance, motivation and constraints; shramdan as part of volunteerism

Citizenship, constitution and human rights

Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information

Family and society

Concept of family, community (PRIs and other community based organisations) and society

Semester 2

Importance and role of youth leadership

Meaning, types and traits of leadership, qualities of good leaders; importance and roles of youth leadership

Life competencies

Definition and importance of life competencies, problem-solving and decision-making, inter personal communication

Youth development programmes

Development of youth programmes and policy at the national level, state level and voluntary sector; youth-focused and youth-led organisations

Health, hygiene and sanitation

Definition needs and scope of health education; role of food, nutrition, safe drinking water, water born diseases and sanitation (Swachh Bharat Abhiyan) for health; national health programmes and reproductive health.

Youth health, lifestyle, HIV AIDS and first aid

Healthy lifestyles, HIV AIDS, drugs and substance abuse, home nursing and first aid

Youth and yoga

History, philosophy, concept, myths and misconceptions about yoga; yoga traditions and its impacts, yoga as a tool for healthy lifestyle, preventive and curative method

Semester 3

Course Title: National Service Scheme III

Vocational skill development

To enhance the employment potential and to set up small business enterprises skills of volunteers, a list of 12 to 15 vocational skills will be drawn up based on the local conditions and opportunities. Each volunteer will have the option to select two skill-areas out of this list

Issues related environment

Environmental conservation, enrichment and sustainability, climatic change, natural resource management (rain water harvesting, energy conservation, forestation, waste land development and soil conservations) and waste management

Disaster management

Introduction and classification of disaster, rehabilitation and management after disaster; role of NSS volunteers in disaster management.

Entrepreneurship development

Definition, meaning and quality of entrepreneur; steps in opening of an enterprise and role of financial and support service institution.

Formulation of production oriented project

Planning, implementation, management and impact assessment of project

Documentation and data reporting

Collection and analysis of data, documentation and dissemination of project reports

Semester 4

Course Title: National Service Scheme IV

Youth and crime

Sociological and psychological factors influencing youth crime, cyber crime, peer mentoring in preventing crime and awareness for juvenile justice

Civil/self defence

Civil defence services, aims and objectives of civil defence; needs and training of self defence

Resource mobilisation

Writing a project proposal of self fund units (SFUs) and its establishment

Additional life skills

Positive thinking, self confidence and esteem, setting life goals and working to achieve them, management of stress including time management.



Syllabus

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3MC04	Physical Education & Yoga Practices	0	-	4	4	2

Semester I: Physical Education and Yoga Practices

1. Teaching of skills of Football – demonstration, practice of the skills, correction, involvement in game situation (For girls teaching of Tennikoit)
2. Teaching of different skills of Football – demonstration, practice of the skills, correction, involvement in game situation (For girls teaching of Tennikoit)
3. Teaching of advance skills of Football – involvement of all the skills in game situation with teaching of rules of the game
4. Teaching of skills of Basketball – demonstration, practice of the skills, correction of skills, involvement in game situation
5. Teaching of skills of Basketball – demonstration, practice of the skills, involvement in game situation
6. Teaching of skills of Basketball – involvement of all the skills in game situation with teaching of rule of the game
7. Teaching of skills of Kabaddi – demonstration, practice of the skills, correction of skills, involvement in game situation
8. Teaching of skills of Kabaddi – demonstration, practice of the skills, correction of skills, involvement in game situation
9. Teaching of advance skills of Kabaddi – involvement of all the skills in game situation with teaching of rule of the game
10. Teaching of skills of Ball Badminton – demonstration, practice of the skills, correction of skills, involvement in game situation
11. Teaching of skills of Ball Badminton – involvement of all the skills in game situation with teaching of rule of the game
12. Teaching of some of Asanas – demonstration, practice, correction and practice
13. Teaching of some more of Asanas – demonstration, practice, correction and practice
14. Teaching of skills of Table Tennis – demonstration, practice of skills, correction and practice and involvement in game situation
15. Teaching of skills of Table Tennis – demonstration, practice of skills, correction and practice and involvement in game situation
16. Teaching of skills of Table Tennis – involvement of all the skills in game situation with teaching of rule of the game
17. Teaching – Meaning, Scope and importance of Physical Education
18. Teaching – Definition, Type of Tournaments
19. Teaching – Physical Fitness and Health Education
20. Construction and laying out of the track and feld (*Te girls will have Tennikoit and Trow Ball)

Semester II: Physical Education and Yoga Practices

1. Teaching of skills of Hockey – demonstration practice of the skills and correction.
2. Teaching of skills of Hockey – demonstration practice of the skills and correction. And involvement of skills in games situation
3. Teaching of advance skills of Hockey – demonstration practice of the skills and correction. Involvement of all the skills in games situation with teaching of rules of the game
4. Teaching of skills of Kho-Kho – demonstration practice of the skills and correction.
5. Teaching of skills of Kho-Kho – demonstration practice of the skills and correction. Involvement of the skills in games situation
6. Teaching of advance skills of Kho-Kho – demonstration practice of the skills and correction. Involvement of all the skills in games situation with teaching of rules of the game
7. Teaching of different track events – demonstration practice of the skills and correction.
8. Teaching of different track events – demonstration practice of the skills and correction.
9. Teaching of different track events – demonstration practice of the skills and correction with competition among them.
10. Teaching of different field events – demonstration practice of the skills and correction.
11. Teaching of different field events – demonstration practice of the skills and correction.
12. Teaching of different field events – demonstration practice of the skills and correction.
13. Teaching of different field events – demonstration practice of the skills and correction with competition among them.
14. Teaching of different asanas – demonstration practice and correction.
15. Teaching of different asanas – demonstration practice and correction.
16. Teaching of different asanas – demonstration practice and correction.
17. Teaching of different asanas – demonstration practice and correction.
18. Teaching of weight training – demonstration practice and correction.
19. Teaching of circuit training – demonstration practice and correction.
20. Teaching of calisthenics – demonstration practice and correction.

Medi-Caps University, Indore
Faculty of Agriculture
Model New Scheme as per Medi-Caps University

Second Year (Odd Semester - III Sem)						
Sr. No.	Subject Code	Courses	L	T	P	Credit
1	AG3CO16	Crop Production Technology – I (<i>Kharif Crops</i>)	1	0	1	2
2	AG3CO17	Fundamentals of Plant Breeding	2	0	1	3
3	AG3CO18	Agricultural Finance and Cooperation	2	0	1	3
4	AG3CO20	Farm Machinery and Power	1	0	1	2
5	AG3CO21	Production Technology for Vegetables and Spices	1	0	1	2
6	AG3CO23	Statistical Methods	1	0	1	2
7	AG3CO24	Livestock and Poultry Management	3	0	1	4
8	AG3MC06	Environmental Studies and Disaster Management	2	0	1	3
9	AG3AE13	Agri- Informatics	1	0	1	2
10	AG3MC02/04	NSS/Physical Education & Yoga Practices	0	0	2	2
		Total	14	0	11	25



Syllabus
III Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3AE13	Agri- Informatics	1	-	2	3	2

Course Objectives:

1. To understand Computers
2. To gain technical knowledge about computer programming languages
3. To gain complete technical knowledge of Computer Models
4. To understand role of Apps in Agriculture
5. To gain knowledge about Contingent crop-planning

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction to Computers

Introduction to Computers, Operating Systems, definition and types, Applications of MS Office for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, uses of DBMS in Agriculture.

Unit-2:-Computer programming languages

World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations. e-Agriculture, concepts and applications, Use of ICT in Agriculture.

Unit-3:-Computer Models

Computer Models for understanding plant processes. IT application for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management.

Unit-4:-Apps in Agriculture

Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc; Geospatial technology for generating valuable agri-information.

Unit-5:-Contingent crop-planning

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

Case Studies:

Optional

List of Practicals:

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

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized with the importance of Computers.
- B. Student will come to know about computer programming languages.
- C. Student will come to know about the technical knowledge of Computer Models
- D. Student will know the role of Apps in Agriculture
- A. Student will come to know about Contingent crop-planning

Text Books:

1. *Vanitha G. Agro-Informatics, New India Publishing Agency.*
2. *Richard Duncombe(2018) Digital Technologies for Agricultural and Rural Development in the Global South Paperback, ABI Publishing.*

Reference Books:

- B. *Petraq Papajorgji(2018), Innovations and Trends in Environmental and Agricultural Informatics IGI Global.*

Web Source:

1. <http://agritech.tnau.ac.in/>
2. <https://agriinfo.in/>

Open Learning Source:

1. <http://kiran.nic.in/>
2. <https://apan.net/meetings/apan46/files/20/20-01-01-01.pdf>
3. <https://icar.org.in/e-books>



Syllabus
III Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO18	Agricultural Finance and Cooperation	2	-	2	4	3

Course Objectives:

1. To understand Agricultural Finance
2. To gain complete knowledge about Sources of agricultural finance
3. To gain technical knowledge of financing institutions
4. To understand Agricultural Cooperation
5. To gain knowledge about cooperatives societies

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Introduction

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

Unit-2:-Sources of agricultural finance

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

Unit-3:- financing institutions

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

Unit-4:-Agricultural Cooperation

Basic guidelines for preparation of project reports- Bank norms – SWOT analysis. Agricultural Cooperation – Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture.

Unit-5:-cooperatives societies

Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing; role of ICA, NCUI, NCDC, NAFED.

Case Studies:

Optional

List of Practicals:

1. Determination of most profitable level of capital use.
2. Optimum allocation of limited amount of capital among different enterprise.
3. Analysis of progress and performance of cooperatives using published data.
4. Analysis of progress and performance of commercial banks and RRBs using published data.
5. Visit to a commercial bank, cooperative bank and cooperative society to acquire first-hand knowledge of their management, schemes and procedures.
6. Estimation of credit requirement of farm business – A case study.
7. Preparation and analysis of balance sheet – A case study.
8. Preparation and analysis of income statement – A case study.
9. Appraisal of a loan proposal– A case study.
10. Techno-economic parameters for preparation of projects.
11. Preparation of Bankable projects for various agricultural products and its value-added products.
12. Seminar on selected topics.

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized with the importance of Agricultural Finance.
- B. Student will come to know about Sources of agricultural finance.
- C. Student will come to know about the financing institutions.
- D. Student will know the Agricultural Cooperation.
- E. Student will come to know about cooperatives societies.

Text Books:

1. S. Subba Reddy, P. Raghu Ram, 1996, *Agricultural finance and management*, Oxford & IBH Pub. Co, New Delhi
2. Kamat, G.S., 1978, *New Dimensions of Cooperative Management*, Himalyan Publishing House, Mumbai.
3. Nelson and Murray, 1988. *Agricultural Finance*. Kalyani Publishers, New Delhi.

Reference Books:

1. Muniraj, R. 1987, *Farm finance for development*, Oxford & IBH Pub. Co., New Delhi.
2. Singh, J.P., 1988, *Agricultural Finance Theory and Practices*, Ashish Publishing House, New Delhi.
3. Pandey, U.K. 1990. *An Introduction to Agricultural Finance*, Kalyani Publishers, New Delhi.

Web Source:

1. http://ecoursesonline.iasri.res.in/Courses/Agricultural%20Finance%20&%20Cooperation/AEC0241/St_art%20to%20read%20the%20Course.html
2. <https://agriinfo.in/economic/35/>
3. <http://kiran.nic.in/>

Open Learning Source:

1. http://agritech.tnau.ac.in/agricultural_marketing/agrimark_index.html
2. <http://kiran.nic.in/>
3. <https://icar.org.in/e-books>



Syllabus
III Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO16	Crop Production Technology-I (<i>Kharif</i> crops)	1	-	2	3	2

Course Objectives:

1. To understand cultivation of *Kharif* Cereals crops
2. To gain complete knowledge about cultivation of *Kharif* Pulses crops
3. To gain technical knowledge of cultivation of *Kharif* oilseeds crops
4. To understand cultivation of *Kharif* fibre crops
5. To gain knowledge about cultivation of *Kharif* forage crops

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-*Kharif* Cereals crops

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

Unit-2:-*Kharif* Pulses crops

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of ***Kharif* crops Pulses**-pigeon pea, moonbeam and urd;

Unit-3:-*Kharif* oilseeds crops

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of ***Kharif* crops oilseeds**- groundnut, and soybean;

Unit-4:-*Kharif* fiber crops

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of ***Kharif* crops fibre crops**- cotton & jute;

Unit-5:-*Kharif* forage crops

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of ***Kharif* forage crops** -sorghum, cowpea, cluster bean and Napier. forage crops-sorghum, cowpea, cluster bean and Napier.

Case Studies:

Optional

List of Practicals:

1. Rice nursery preparation,
2. transplanting of rice,
3. sowing of soybean, pigeon pea and mungbean. maize, groundnut and cotton,
4. effect of seed size on germination and seedling vigour of *kharif* season crops,
5. effect of sowing depth on germination of *kharif* crops,
6. identification of weeds in *kharif* season crops,
7. top dressing and foliar feeding of nutrients,
8. study of yield contributing characters and yield calculation of *kharif* season crops,
9. study of crop varieties and important agronomic experiments at experimental farm.
10. study of forage experiments, morphological description of *kharif* season crops,
11. visit to research centres of related crops

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized with the importance of *Kharif* Cereals crops
- B. Student will come to know about cultivation of *Kharif* Pulses crops
- C. Student will come to know about the cultivation of *Kharif* oilseeds crops
- D. Student will know the cultivation of *Kharif* fibre crops
- E. Student will come to know about cultivation of *Kharif* forage crops

Text Books:

1. Singh, Chhidda, Singh, Prem and Singh, Rajbir. 2003. *Modern Techniques of Raising Field Crops*, Oxford & IBH Publishing Co., New Delhi.
2. Panda, S.C. 2012. *Modern Concepts and Advance Principles in Crop Production*. Agrobios (India), Jodhpur
3. Singh, S.S. and Singh, Rajesh. 2013. *Crop Management Under Irrigated and Rainfed Conditions*. Kalyani Publishers, New Delhi.
4. Singh, S.S. and Singh, Rajesh. 2015. *Principles and Practices of Agronomy (5th Re-set)*, Kalyani Publishers, New Delhi, Kalyani Publishers, Ludhiana.
5. Prasad, Rajendra. 2002. *Text Book of Field Crops Production*, ICAR, New Delhi.

Reference Books:

1. ICAR. 2010. *Handbook of Agriculture (6th edition)*, Indian Council of Agricultural Research, New Delhi
2. Rathore, P.S. 2000. *Techniques and Management of Field Crop Production*, Agrobios (India), Jodhpur.
3. Reddy, S.R. 2012. *Agronomy of Field Crops*. Kalyani Publishers, Ludhiana.

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Field%20Crops/AGRO302/Start%20to%20read%20the%20Course.html>
2. <http://vikaspedia.in/agriculture/crop-production>
3. <https://agriinfo.in/agronomy/49/>
4. http://agritech.tnau.ac.in/agriculture/agri_index.html

Open Learning Source:

2. <https://www.agmoocs.in/content/basic-crop-cultivation>
1. <https://nptel.ac.in/courses/126105013/#>



Syllabus
III Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3MC06	Environmental Studies and Disaster Management	2	-	2	4	3

Course Objectives:

1. To make the students aware of current issues regarding the environment and environmental education
2. To make the students cognizant of various natural resources and their associated problems
3. To make the students understand the ecological balances that maintain the livelihood and the importance of biodiversity to sustain life.
4. To make the students understand the types of pollution and enhance the student's ability of dealing with the problems in a practical manner
5. To inspire students for innovative approach of environmental issues
6. To make student aware about natural and man made disasters and Humanitarian Assistance before and after disaster

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Environmental Communication and Public Awareness

Scope and importance of environmental studies. Multidisciplinary nature of environmental studies and need for public awareness. Public awareness and rural outreach; Concept of sustainability and sustainable development – Principles, imperatives and threats; three E's to optimize sustainable development, Sustainable Agriculture and Organic Farming.

Unit-2:-Natural resources

a) Forest resources: Use and over-exploitation; Deforestation; Case studies. Timber extraction, mining; Dams and their effects on forest and tribal people.

b) Water resources: Use and over-utilization of surface and ground water; Floods; Drought; Conflicts over water; Dams-benefits and problems.

c) Food resources: World food problems; Changes caused by agriculture and overgrazing; Effects of modern agriculture; Fertilizer-pesticide problems; Water logging; Salinity; Case studies.

d) Land resources: Land as a resource; Land degradation; Man induced landslides; Soil erosion and desertification. Role of an individual in conservation of natural resources.

Unit-3:-Ecosystem and Biodiversity

Ecosystems; Concept of an ecosystem; Structure and function of ecosystem; Producers, consumers and decomposers; Energy flow in ecosystem; Food chains, food webs.

Biodiversity and its conservation; Introduction, definition, genetic, species and ecosystem diversity. 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.

Unit-4:-Environmental Pollution

Environmental Pollution: definition, cause, effects and control measures air pollution, water pollution, soil pollution. Pollution case studies. Solid waste management: causes, effects and control measures of urban and industrial wastes

Unit-5:-Disaster and its Management

Natural and Man Made Disasters, their types and effects. Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community-based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

Case Studies:

Optional

List of Practicals:

1. Pollution case studies.
2. Case Studies- Field work: Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain.
3. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural, study of common plants, insects, birds and study of simple ecosystems-pond, river, hill slopes, etc.

Project:

Optional.

Course Outcomes:

- A. Students will understand the significance of environmental education
- B. Students will attain knowledge regarding natural resources and their efficient management.
- C. Students will learn to control environmental pollution.
- D. Students will gain fundamental knowledge of the functioning of ecosystems and the importance of biodiversity
- E. Students will understand the usefulness of integrating management principles in disaster mitigation work

Text Books:

1. *Dr. Preeti Jain, Dr. Devaanshi Jagwani, Environmental Science, Manthan Publications, 2016*
2. *Dr. Surinder Deswal, A. Deswal, A Basic Course in Environmental Studies, Dhanpat Rai & Co. publication, 2016*

3. *R. Rajgopalan, Environmental Studies, Oxford IBH Publication, 2011*
4. *Climate change.1995: Adaptation and mitigation of climate change-Scientific Technical Analysis Cambridge University Press, Cambridge.*
5. *Sharma, R.K. & Sharma, G. Natural Disaster. APH Publishing Corporation, 2005.*

Reference Books:

1. *Daniel D. Chiras, Environmental Science, Jones & Bartlett Ltd , Latest Edition*
2. *G. M. Masters, Introduction to Environmental Science and Engineering Pearson Education Pvt. Ltd, Latest Edition*
3. *A. K. De, Environmental Chemistry, New Age International, Latest Edition*
4. *Jr. G. T. Miller, Environmental Science, Wadsworth Publishing, Latest Edition*
5. *D. K. Asthana, Meera Asthana, A text book of Environmental Studies, S. Chand&Co., Latest Edition.*

Web Source:

1. <https://www.ugc.ac.in/oldpdf/modelcurriculum/Chapter2.pdf>
2. <http://download.nos.org/333courseE/10.pdf>
3. <http://download.nos.org/333courseE/5.pdf>
4. <http://www.agriinfo.in/default.aspx?page=topiclist&superid=1&catid=37>
5. http://agritech.tnau.ac.in/agriculture/agri_weedmgt.html

Open Learning Source:

1. <https://swayam.gov.in/courses/public>
2. <http://nptel.ac.in/course.php>



Syllabus
III Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO20	Farm Machinery and Power	1	-	2	3	2

Course Objectives:

1. To understand I.C. engines
2. To gain complete knowledge of different systems of I.C. engines
3. To gain technical knowledge of Tillage implement
4. To understand sowing and planting equipment
5. To gain knowledge about Plant Protection equipment

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-I.C. engines

Status of Farm Power in India, Sources of Farm Power, I.C. engines, working principles of I.C. Engines, comparison of two stroke and four stroke cycle engines, Study of different components of I.C. engine, I.C. engine terminology and solved problems.

Unit-2:-different systems of I.C. engines

Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor, Familiarization with Power transmission system: clutch, gear box, differential and final drive of a tractor,

Unit-3:-Tillage implement

Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Tillage implement, implement for hill agriculture,

Unit-4:-sowing and planting equipment

Implement for intercultural operations, Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples,

Unit-5:-Plant Protection equipment,

Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.

Case Studies:

Optional

List of Practicals:

1. Study of different components of I.C. engine.
2. To study air cleaning and cooling system of engine,
3. Familiarization with clutch, transmission, differential and final drive of a tractor,
4. Familiarization with lubrication and fuel supply system of engine,
5. Familiarization with brake, steering, hydraulic control system of engine,
6. Learning of tractor driving,
7. Familiarization with operation of power tiller,
8. Implements for hill agriculture,
9. Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow .
10. Familiarization with seedcum-fertilizer drills their seed metering mechanism and calibration,
11. planters and transplanted Familiarization with different types of sprayers and dusters Familiarization with different intercultivation equipment,
12. Familiarization with harvesting and threshing machinery.

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized *I.C. engines*
- B. Student will come to know about different systems of *I.C. engines*
- C. Student will come to know about the technical knowledge of Tillage implement
- D. Student will know the sowing and planting equipment
- E. Student will come to know about Plant Protection equipment

Text Books:

1. *Principles of Agricultural Engineering. Vol. I. 2012. Michael, A.M. and T.P. Ojha. Jain Brothers, Jodhpur.*
2. *Farm Tractors, Maintenance and Repair. 1989. Rai and Jain. Tata Mc Graw Hill Publ. New Delhi.*
3. *Elements of Farm Machinery. 1989. Srivastava, A.C. Oxford IBH Publ. Company, New Delhi.*

Reference Books:

- C. *Element of Agricultural Engineering. 1990. Sahay, Jagdishwar. Agro. Book Agency, New Chitragupta Nagar, Patna*
- D. *Elements of Agricultural Engineering, Vol. I & III. 1989. Singhal, O.P. SurajPrakashan, Allahabad.*

Web Source:

1. [http://ecoursesonline.iasri.res.in/Courses/Farm%20Power%20and%20Machinery/e-B.sc.%20\(Hort.\)/StartPortableApps.exce](http://ecoursesonline.iasri.res.in/Courses/Farm%20Power%20and%20Machinery/e-B.sc.%20(Hort.)/StartPortableApps.exce)
2. <https://agriinfo.in/agril-engineering/>

Open Learning Source:

1. <https://nptel.ac.in/courses/126105013/#>
2. <https://www.agmoocs.in/courses>



Syllabus
III Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO17	Fundamentals of Plant Breeding	2	-	2	4	3

Course Objectives:

1. To study various objectives and achievements of plant breeding.
2. To understand plant's reproduction and pollination methods.
3. To study different modes of selection methods for self, cross, clonal and mutation breeding in relation to future hybridization technique.
4. To analyse genetic variation, breeding for biotic, abiotic resistance and biotechnological tools for plant breeding.
5. To understand the Intellectual Property Rights with regards plant breeders and farmer's rights.

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction to Plant Breeding

Historical development- introduction, history of plant breeding, scope and objectives of plant breeding, major achievements and prospects. Plant Domestication, Acclimatization and plant Introduction- Centres of origin/ diversity.

Unit-2:- Reproduction and Pollination

Introduction, sexual and asexual modes of reproduction, apomixes, Modes of pollination- self and cross pollination, often cross-pollination. self-incompatibility. Male sterility, genetic consequences, cultivar options.

Unit-3:- Modes of Selection and Breeding Methods

Methods in self-pollinated crops- mass and pure line selection, hybridization techniques and handling of segregating population; Multiline concept. Methods in cross pollinated crops- Ear to row method, Modified Ear to Row, recurrent selection schemes; Heterosis and inbreeding depression.

Development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops, clonal selection and hybridization; Maintenance of breeding records and data collection; Wide hybridization and prebreeding; Polyploidy in relation to plant breeding, mutation breeding-methods and uses.

Unit-4:-Components of Genetic Variation and Biotechnological tools

Heritability and genetic advance. Concepts of population genetics and Hardy-Weinberg Law Breeding for important biotic resistance and Abiotic resistance. Biotechnological tools-DNA markers and marker assisted selection. Participatory plant breeding.

Unit-5:-Intellectual Property Rights (IPR)

Intellectual Property Rights-Patenting, Plant Breeders Right- Farmer's Rights.

Case Studies:

Optional

List of Practicals:

1. Study of Plant Breeder's kit.
2. Study of floral structure of self-pollinated and cross-pollinated crops.
3. Study of Emasculation and hybridization techniques in self- & cross-pollinated crops.
4. Methods of calculating mean, range, variance, standard deviation, heritability.
5. Designs used in plant breeding experiments, analysis of Randomized Block Design.

Project:

Optional.

Course Outcomes:

- A. The student will be able to understand basic principles of plant breeding.
- B. The student will be able to know about the methods of plant reproduction system.
- C. The student will be able to demonstrate knowledge about the different plant hybridization technique.
- D. The student will be able to evaluate components of genetic variation and latest research on biotechnology with regards plant breeding.
- E. The student will be able to understand IPR rules and its application.

Text Books:

1. Alard, R.W. 2000. *Principles of Plant Breeding*. John Willey & Sons, New York.
2. Chahel, G.S. and S.S. Ghosal. 2002. *Principles and Procedures of Plant Breeding, Biotechnological and Conventional Approaches*. Narosa Publishing House, New Delhi.
3. Singh, B.D. 2005. *Plant Breeding*. Kalyani Publishing House, New Delhi.
4. Singh, P. 2001. *Essentials of Plant Breeding-Principles and Methods*. Kalyani Publishing House, New Delhi.

Reference Books:

1. Jain, H.K. and M.C. Kharkwal. 2004. *Plant Breeding- Mendelian to Molecular Approach*. Narosa Publishing House, New Delhi.
2. Sharma, A.K. 2005. *Breeding Technology of Crop Plants (Edt.)*. Yash Publishing House, Bikaner.
3. Shekhawat, S. S. (ed) (2016). *Advances and Current Issues in Agriculture, Vol. III*. ShikshaPrakashan, S. M. S. Highway, Jaipur

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Plant%20Breeding-I/GBPR211/Start%20to%20read%20the%20Course.html>
2. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Plant%20Biotechnology/GPBR311/Start%20to%20read%20the%20Course.html>
3. http://agritech.tnau.ac.in/agriculture/agri_index.html

Open Learning Source:

1. <https://swayam.gov.in/courses/public>
2. <http://nptel.ac.in/course.php>
3. <https://ecourses.icar.gov.in/Home1.aspx>
4. <http://kiran.nic.in/>



Syllabus
III Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO24	Livestock and Poultry Management	3	-	1	4	4

Course Objectives:

1. To understand importance of livestock in the national economy.
2. To gain complete knowledge about Indian and exotic breeds.
3. To gain knowledge of Nutrients and their functions.
4. To understand Feeding of livestock
5. To gain knowledge about livestock and poultry diseases

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction of livestock

Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. Management of calves, growing heifers and milch animals.

Unit-2:- Indian and exotic breeds

Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers. Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry.

Unit-3:- Nutrients and their functions

Improvement of farm animals and poultry. Digestion in livestock and poultry. Classification of feedstuffs. Proximate principles of feed. Nutrients and their functions.

Unit-4:-Feeding of livestock

Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry.

Unit-5:-livestock and poultry diseases

introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.

Case Studies:

Optional

List of Practicals:

1. External body parts of cattle, buffalo, sheep, goat, swine and poultry.
2. Handling and restraining of livestock.

3. Identification methods of farm animals and poultry.
4. Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records.
5. Judging of cattle, buffalo and poultry.
6. Culling of livestock and poultry.
7. Planning and layout of housing for different types of livestock.
8. Computation of rations for livestock. Formulation of concentrate mixtures.
9. Clean milk production, milking methods. Hatchery operations, incubation and hatching equipments.
10. Management of chicks, growers and layers.
11. Debeaking, dusting and vaccination.
12. Economics of cattle, buffalo, sheep, goat, swine and poultry production.

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized with the livestock
- B. Student will come to know about Indian and exotic breeds
- C. Student will come to know about the Nutrients and their functions
- D. Student will know the Feeding of livestock
- E. Student will come to know about livestock and poultry diseases

Text Books:

1. Banerjee, G.C. 2013. *A Text Book of Animal Husbandary. 8th Ed. Oxford & IBH Pub.CO.PvtLtd.N-Delhi.*
2. Devendra C and Mecleroy GB, 1982. *Goat and Sheep Production in Tropics.*
3. Sastry N S R and Thomas, Ck 2006. *Livestock Production and Management, Kalyani.*
4. Thomas CK and Sastry, NSR. 1991. *Dairy Bovine Production. Kalyani.*
5. ICAR, *Handbook of Animal Husbandry, 2011. 3rd revised Ed.*

Reference Books:

1. Dimiri, U, Sharma, M C and Tiwari R. 2013. *Swine production and Health Management. New India Pub Agency.*
2. Sastry N S R and Thomas, Ck 2006. *Livestock Production and Management, Kalyani Pub.*
3. Singh, R A. 1996. *Poultry Production 3rd Ed. Kalyani.*
4. Prasad, J. 2008. *Poultry Production and management. Kalyani Pub.*

Web Source:

3. http://agritech.tnau.ac.in/agriculture/agri_index.html
4. <https://icar.org.in/e-books>
5. <http://vikaspedia.in/agriculture/crop-production>

Open Learning Source:

1. http://agritech.tnau.ac.in/agriculture/agri_index.html
2. <https://nptel.ac.in/courses/126105013/#>
3. <https://www.agmoocs.in/courses>



Syllabus
III Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO21	Production Technology for Vegetables and Spices	1	-	2	3	2

Course Objectives:

1. To understand Importance of vegetables & spices
2. To gain Complete knowledge about cultivation practises
3. To gain technical knowledge of Cultivation practises of Cole crops
4. To understand Cultivation practises of Bulb and Root crops
5. To gain knowledge about Cultivation practises of Tuber crops

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Importance of vegetables & spices

Importance of vegetables & spices in human nutrition and national economy, kitchengardening, brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of important vegetable and spices (*Tomato, Brinjal, Chilli, Capsicum, Cucumber,*

Unit-2:- cultivation practises

Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of important vegetable *Melons, Gourds, Pumpkin, French bean, Peas.*

Unit-3:-Cultivation practises of Cole crops

Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of important *Cole crops such as Cabbage, Cauliflower, Knol-khol.*

Unit-4:-Cultivation practises of Bulb and Root crops

Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of important *Bulb crops such as Onion, Garlic; Root crops such as Carrot, Radish, Beetroot.*

Unit-5:-Cultivation practises of Tuber crops

Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of important *Tuber crops such as Potato; Leafy vegetables such as Amaranth, Palak. Perennial vegetables).*

Case Studies:

Optional

List of Practicals:

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

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized with the importance of vegetables & spices
- B. Student will come to know about cultivation practises
- C. Student will come to know about the Cultivation practises of Cole crops
- D. Student will know Cultivation practises of Bulb and Root crops
- E. Student will come to know about Cultivation practises of Tuber crops

Text Books:

- 1 B.R.Choudhary *A Text book on production technology of vegetables* (2009) Kalyani Publishers
- 2 K S Yawalkar *Vegetable crops in India* (2008) Agri-Horticultural Pub.House. Nagpur
- 3 K.V.Kamath *Vegetable Crop Production* (2007) Oxford Book Company
- 4 M.K.Rana *Olericulture in India* (2008) Kalyani Publishers
- 5 M.S.Dhaliwal *Handbook of Vegetable Crops* (2008) Kalyani Publishers
- 6 NathPrem *Vegetables for the Tropical Regions* (1994) ICAR New Delhi
- 7 P.Hazra *Modern Technology in Vegetable Production* (2011) New India Publishing Agency, New Delhi
- 8 Pruthi, J.S *Major Spices of India- Crop Management Postharvest Technology* (1993) ICAR

Reference Books:

- 1.Pruthi, J.S *Minor Spices of India- Crop Management Postharvest Technology* (2001) ICAR
2. S. Thamburaj *Text book of vegetable, tuber crops and Spices* (2014) ICAR
3. Shanmugavelu, K.G. Kumar, N and Peter, K.V *Production technology of spices and plantation crops* (2005) Agrosis, Jodhpur
4. Singh, D.K. *Modern Vegetable varieties and production* (2007) IBN publishers, Technology International Book Distributing Co, Lucknow 13 Singh, Umashankar *Indian Vegetables* (2008) Anmol Publications. Pvt.Ltd .New Delhi
5. T.K.Bose *Vegetable Crops* (2002) Nayaprakash, Kolkata
- 6.T.R.Gopal Krishnan *Vegetable Crops* (2007) New India Publishing Agency. New Delhi
7. D.N. Singh etal. *Winter Vegetables: Advances & Developments* Satish Serial Pub. House
- 8.Ramchandra R.K. *Breeding of Vegetable crops* Jaya Publishing House
9. Sharma &Katoch *Practicals on Vegetable Production Technology* Jaya Publishing House
10. Mishra, R. *Diseases of Vegetable crops and their integrated management: A colour handbook* NIPA
11. Boswell, V.R. *Seeds Production: Vegetables & Root Crops* ISPG

Web Source:

6. <http://vikaspedia.in/agriculture>
7. <https://agriinfo.in/horticulture/47/>
8. <http://kiran.nic.in/>
9. http://agritech.tnau.ac.in/horticulture/horti_index.html

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/courses/126105013/#>



Syllabus
III Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO23	Statistical Methods	1	-	2	3	2

Course Objectives:

1. To understand Agriculture Statistics
2. To gain complete knowledge about Probability
3. To gain statistical knowledge of Correlation
4. To understand Analysis of Variance
5. To gain knowledge about Sampling Methods,

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction to Statistics

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

Unit-2:-Probability, . Binomial and Poisson Distributions

Definition of Probability, Addition and Multiplication Theorem (without proof). Simple Problems Based on Probability. Binomial & Poisson Distributions.

Unit-3:- Correlation and Regression

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

Unit- 4:- Chi-Square Test and Analysis of Variance

Chi-Square Test of Independence of Attributes in 2×2 Contingency Table. Introduction to Analysis of Variance, Analysis of One Way Classification.

Unit-5:-Sampling Methods,

Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement, Use of Random Number Tables for selection of Simple Random Sample.

Case Studies:

Optional

List of Practical's:

1. Graphical Representation of Data.
2. Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles.
3. Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles.
4. Measures of Dispersion (Ungrouped Data).
5. Moments, Measures of Skewness & Kurtosis (Ungrouped Data).
6. Moments, Measures of Skewness & Kurtosis (Grouped Data).
7. Correlation & Regression Analysis.
8. Application of One Sample t-test.
9. Application of Two Sample Fisher's t-test.
10. Chi-Square test of Goodness of Fit.
11. Chi-Square test of Independence of Attributes for 2×2 contingency table.
12. Analysis of Variance One Way Classification.
13. Analysis of Variance Two Way Classification.
14. Selection of random sample using Simple Random Sampling.

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized with the importance Agriculture Statistics
- B. Student will come to know about Probability
- C. Student will come to know about the statistical knowledge of Correlation
- D. Student will know the Analysis of Variance
- E. Student will come to know about Sampling Methods,

Text Books:

1. Chandel, S.R.S. 1998. *Handbook of Agril. Statistics*. Achal Prakashan Mandir, Kanpur.
2. Gupta S.P. 2002. *Statistical Methods*. Sultan Chand & Sons, New Delhi.

Reference Books:

- E. Agarwal B.L. 1991. *Basic Statistics* Wiley Eastern, New Delhi.

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Statistics/Start%20to%20read%20the%20Course.html>
2. <http://agritech.tnau.ac.in/>
3. <https://icar.org.in/e-books>

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/courses/126105013/#>

Medi-Caps University, Indore
Faculty of Agriculture
Model New Scheme as per Medi-Caps University

Second Year (Even Semester - IV Sem)						
Sr. No.	Subject Code	Courses	L	T	P	Credit
1	AG3CO25	Crop Production Technology –II (<i>Rabi Crops</i>)	1	0	1	2
2	AG3CO26	Production Technology for Ornamental Crops, MAP and Landscaping	1	0	1	2
3	AG3CO27	Renewable Energy and Green Technology	1	0	1	2
4	AG3CO28	Problematic Soils and their Management	2	0	0	2
5	AG3CO29	Production Technology for Fruit and Plantation Crops	1	0	1	2
6	AG3CO30	Principles of Seed Technology	1	0	2	3
7	AG3CO31	Farming System & Sustainable Agriculture	1	0	0	1
8	AG3CO32	Agricultural Marketing Trade & Prices	2	0	1	3
9	AG3CO33	Introductory Agro-meteorology & Climate Change	1	0	1	2
10	AG3EL01	Agribusiness Management	2	0	1	3
		Total	13	0	9	22



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
IV Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO32	Agricultural Marketing Trade & Prices	2	-	2	4	3

Course Objectives:

1. To understand Agricultural marketing
2. To gain complete knowledge about Marketable and marketed surplus,
3. To gain knowledge of market promotion
4. To understand marketing channels
5. To gain knowledge about Role of Govt. in agricultural marketing:

Prerequisites: 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction of Agricultural marketing

Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation, classification and characteristics of agricultural markets; demand, supply and producer's surplus of Agri-commodities: nature and determinants of demand and supply of farm products, producer's surplus – meaning and its types,

Unit-2:-marketable surplus

Marketable and marketed surplus, factors affecting marketable surplus of Agri-commodities; product life cycle (PLC) and competitive strategies: Meaning and stages in PLC; characteristics of PLC; strategies in different stages of PLC; pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing;

Unit-3:- market promotion

market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits; marketing process and functions: Marketing process-concentration, dispersion and equalization; exchange functions – buying and selling; physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labelling (Agmark);

Unit-4:-marketing channels

Market functionaries and marketing channels: Types and importance of agencies involved in agricultural

marketing; meaning and definition of marketing channel; number of channel levels; marketing channels for different farm products; Integration, efficiency, costs and price spread: Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm

commodities; ways of reducing marketing costs;

Unit-5:-Public sector institutions

Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions; cooperative marketing in India; Risk in marketing: Types

of risk in marketing; speculation & hedging; an overview of futures trading; Agricultural prices and policy: Meaning and functions of price; administered prices; need for agricultural price policy; Trade: Concept of International Trade and its need, theories of absolute and comparative advantage. Present status and prospects of international trade in Agri-commodities; GATT and WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR.

Case Studies:

Optional

List of Practicals:

1. Plotting and study of demand and supply curves and calculation of elasticities;
2. Study of relationship between market arrivals and prices of some selected commodities;
3. Computation of marketable and marketed surplus of important commodities;
4. Study of price behaviour over time for some selected commodities;
5. Construction of index numbers;
6. Visit to a local market to study various marketing functions performed by different agencies, identification of marketing channels for selected commodity,
7. collection of data regarding marketing costs,
8. margins and price spread and presentation of report in the class;
9. Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc.
10. to study their organization and functioning;
11. Application of principles of comparative advantage of international trade.

Project:

Optional.

Course Outcomes:

- A. Student will be familiarized with the importance of Agricultural marketing
- B. Student will come to know about Marketable and marketed surplus,
- C. Student will come to know about the **market promotion**
- D. Student will know the **marketing channels**
- E. Student will come to know about Role of Govt. in agricultural marketing:

Text Books:

1. Acharya, S.S. and Agarwal, N.L., 1994, *Agricultural Price Analysis and Price Policy*, Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
2. Acharya, S.S. and Agarwal, N.L., 2004, *Agricultural Marketing in India*, Oxford and IBH Publishing Co. New Delhi.
3. G. L. Meena, S. S. Burark, D. C. Pant and Rajesh Sharma, 2017. *Fundamentals of Agribusiness Management*, Agrotech Publishing Academy, Udaipur, ISBN: 978-81-8321-418-6. First edition.

Reference Books:

- A. Kahlon, A.S. and George, M.V., 1985, *Agricultural Marketing and Price Policy*, Allied Publication Pvt. Ltd., New Delhi.
- B. Kohls, Richard L. and Uhl, Joseph N., 1980, *Marketing of Agricultural Products*, Macmillan Publishing Co., Inc. New York
- C. Mamoria, C.B and Joshi, R.L., 1971, *Principles and Practice of Marketing in India*, Kitabmahal, Allahabad

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Agricultural%20Marketing%20Trade%20and%20Prices/AECO242/Start%20to%20read%20the%20Course.html>
2. http://agritech.tnau.ac.in/agricultural_marketing/agrimark_index.html
3. <http://vikaspedia.in/agriculture/market-information>

Open Learning Source:

1. <https://www.agmoocs.in/>
2. <https://nptel.ac.in/courses/126105013/#>



Syllabus
IV Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO25	Crop Production Technology –II (Rabi Crops)	1	-	2	3	2

Course Objectives:s

1. To understand cultivation of wheat and barley
2. To gain complete knowledge about cultivation of chickpea, lentil, peas,
3. To gain technical knowledge of cultivation of oilseeds and sugar crops
4. To understand cultivation of medicinal and aromatic crops
5. To gain knowledge about cultivation of berseem, Lucerne and oat.

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1: -Rabi crops; cereals

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

Unit-2:-Rabi crops; pulses

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; pulses-chickpea, lentil, peas,

Unit-3:- Rabi crops; oilseeds

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; oilseeds-rape seed, mustard and sunflower; sugar crops-sugarcane;

Unit-4:-Rabi crops; medicinal and aromatic crops

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

Unit-5:-Rabi crops; Forage crops

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

Case Studies:

Optional

List of Practicals:

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

Project:

Optional.

Course Outcomes:

1. Student will be familiarized with the cultivation of wheat and barley.
2. Student will come to know about cultivation of chickpea, lentil, and peas.
3. Student will come to know about the cultivation of oilseeds and sugar crops.
4. Student will know the cultivation of medicinal and aromatic crops
5. Student will come to know about cultivation of berseem, Lucerne and oat.

Text Books:

1. Singh, Chhidda, Singh, Prem and Singh, Rajbir. 2003. Modern Techniques of Raising Field Crops, Oxford & IBH Publishing Co., New Delhi.
2. Singh, S.S. 1998. Crop Management Under Irrigated and Rainfed Conditions. Kalyani Publishers, New Delhi.
4. Singh, S.S. and Singh, Rajesh. 2013. Crop Management Under Irrigated and Rainfed Conditions. Kalyani Publishers, New Delhi.
5. Rathore, P.S. 2000. Techniques and Management of Field Crop Production, Agrobios (India), Jodhpur.
6. Prasad, Rajendra. 2002. Text Book of Field Crops Production, ICAR, New Delhi.

Reference Books:

- D. Panda, S.C. 2012. Modern Concepts and Advance Principles in Crop Production. Agrobios (India), Jodhpur
- E. ICAR. 2010. Handbook of Agriculture (6th edition), Indian Council of Agricultural Research, New Delhi.
- F. Reddy, S.R. 2012. Agronomy of Field Crops. Kalyani Books, New Delhi

Web Source:

1. <https://agriinfo.in/agronomy/49/>
2. <http://ecoursesonline.iasri.res.in/Courses/Field%20Crops%20Rabi/AGRO301/Start.html>
3. http://agritech.tnau.ac.in/agriculture/agri_index.html
4. <http://vikaspedia.in/agriculture/crop-production>

Open Learning Source:

1. <https://nptel.ac.in/courses/126105013/#>
2. <https://www.agmoocs.in/courses>



Syllabus
IV Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO31	Farming System & Sustainable Agriculture	1	-	0	1	1

Course Objectives:

1. To understand importance Farming System
2. To gain complete knowledge about Cropping system and pattern
3. To gain technical knowledge of Sustainable agriculture
4. To understand Integrated farming system
5. To gain knowledge about Resource use efficiency

Prerequisites: 12th pass

Co-requisites: Nil

Curriculum:

Unit-1: -Farming System

Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance.

Unit-2: -Cropping system and pattern

Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system.

Unit-3: -Sustainable agriculture

Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, Conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability,

Unit-4: -Integrated farming system

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

Unit-5: - Resource use efficiency

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

Case Studies:

Optional

Project:

Optional.

Course Outcomes:

1. Student will be familiarized with the importance of Farming System
2. Student will come to know about Cropping system and pattern
3. Student will come to know about the Sustainable agriculture
4. Student will know the Integrated farming system
5. Student will come to know Resource use efficiency

Text Books:

1. Panda, S.C. 2004. *Cropping Systems and Farming Systems*, Agrobios (India), Jodhpur.
2. Sharma, Arun K. 2002. *A Handbook of Organic Farming*, Agrobios (India) Ltd., Jodhpur
3. Shukla, Rajeev K. 2004. *Sustainable Agriculture*, Surbhee Publications, Jaipur
4. Palaniappan, S.P. 1985. *Cropping Systems in the Tropics: Principles and Management*, Wiley Easter Ltd. and TNAU, Coimbatore.
5. Reddy S. R. 2016. *Principles of Agronomy (5th edition)*, Kalyani Publishers,

Reference Books:

- G. Balasubramaniyan, P. and Palaniappan, S.P. 2016. *Principles and Practices of Agronomy (2nd edition)*, Agrobios (India), Jodhpur.
- H. Panda, S.C. 2012. *Modern Concepts and Advance Principles in Crop Production*. Agrobios (India), Jodhpur

Web Source:

1. <https://agriinfo.in/agronomy/42/>
2. http://agritech.tnau.ac.in/agriculture/agri_index.html

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/courses/126105013/#>



Syllabus
IV Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO33	Introductory Agro-meteorology & Climate Change	1	-	2	3	2

Course Objectives:

1. To understand importance of agro meteorology
2. To gain complete knowledge about Nature and properties of solar radiation
3. To gain technical knowledge of Atmospheric elements
4. To understand Monsoon
5. To gain complete knowledge about Weather forecasting

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction of meteorology

Meaning and scope of agricultural meteorology; Earth atmosphere- its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze;

Unit-2:-Solar radiation

Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, longwave and thermal radiation, net radiation, albedo; Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, Energy balance of earth;

Unit-3:- Atmospheric humidity,

Atmospheric humidity, concept of saturation, vapour pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification; Artificial rainmaking.

Unit-4:-Monsoon

Monsoon- mechanism and importance in Indian agriculture, Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave. Agriculture and weather relations; Modifications of crop microclimate, climatic normals for crop and livestock production.

Unit-5:-Weather forecasting

Weather forecasting- types of weather forecast and their uses. Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

Case Studies:

Optional

List of Practicals:

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

Project:

Optional.

Course Outcomes:

1. Student will be familiarized with the importance of agro meteorology
2. Student will come to know about Nature and properties of solar radiation
3. Student will come to know about the Atmospheric elements
4. Student will know the Monsoon
5. Student will come to know about Weather forecasting techniques

Text Books:

1. Sacheti, A.K. 1985. Agricultural Meteorological Instructional Cum Practical Manual (Ed.) NCERT Publication, New Delhi.
2. Lal, D.S. 2005 Climatology, Sharda Pustak Bhawan, Allahabad.
3. Varshneya, M.C. and Balakrishna, Pillai, 2003. Text book of Agricultural Meteorology. ICAR, New-Delhi.
3. Murthy, K, and Radha, V. 1995. Practical Manual on Agricultural Meteorology, Kalyani Publishers, New-Delhi

Reference Books:

- I. Balasubramanian, P. and Palaniappan, S.P. 2016. Principles and Practices of Agronomy, Agrobios (India), Jodhpur
- J. Panda, S.C. 2012. Modern Concepts and Advance Principles in Crop Production. Agrobios (India), Jodhpur
- K. Sahu, D.D., 2007. Agrometeorology and Remote sensing: Principles and Practices, Agrobios (India), Jodhpur.

Web Source:

1. <https://agriinfo.in/agronomy/38/>
2. <http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Agronomy%20&%20a%20grc%20Meteorology/AGRO101/Start%20to%20read%20the%20Course.html>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
IV Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO30	Principles of Seed Technology	1	-	4	5	3

Course Objectives:

1. To understand Seed and seed technology:
2. To gain complete knowledge about Foundation and certified seed production
3. To gain technical knowledge of Varietal Identification
4. To understand Seed drying, processing, seed treatment, seed testing.
5. To gain knowledge about Seed marketing

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction of seed technology

Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production, seed quality; Definition, Characters of good quality seed, different classes of seed.

Unit-2:- seed production and certification

Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables. Seed certification, phases of certification, procedure for seed certification, field inspection. Seed Act and Seed Act enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983

Unit-3:- Varietal Identification and GM crops

Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test. Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops and organic seed production.

Unit-4:-Seed Processing

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

Unit-5:-Seed marketing:

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

Case Studies:

Optional

List of Practicals:

1. Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi
2. Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea
3. Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard
4. Seed production in important vegetable crops
5. Seed sampling and testing: Physical purity, germination, viability, etc. Seed and seedling vigour test.
6. Genetic purity test: Grow out test and electrophoresis
7. Seed certification: Procedure, Field inspection, Preparation of field inspection report.
8. Visit to seed production farms, seed testing laboratories and seed processing plant.

Project:

Optional.

Course Outcomes:

1. Student will be familiarized with the importance of Seed.
2. Student will come to know about Foundation and certified seed production
3. Student will come to know about the Varietal Identification
4. Student will know the Seed drying, processing, seed treatment, seed testing.
5. Student will come to know about Seed marketing: structure

Text Books:

1. Agarwal, R.L. 1991. *Seed Technology*. Oxford & IBH Publishing Co. Delhi
2. Agarwal, P.K. 1999. *Seed Technology*. ICAR, New Delhi.
3. Subir Sen and Nabinanda Ghosh. 1999. *Seed Science and Technology*. Kalyani Publishers. New Delhi.
5. Saxena, R.P. 1984. *Beej Sansadhan*. GBPA & T, Pantnagar.
6. Singh, B.D. 2005. *Plant Breeding*. Kalyani Publishing House, New Delhi.
7. Shekhawat, S. S. and S. Gangopadhyay (eds.) (2013). *Quality Fodder Seed Production*. Centre for Forage Management, ARS, SKRAU, Bikaner.

Reference Books:

1. Arya, P.S. 2001. *Vegetable Breeding and Seed Production*. Kalyani Pub., Ludhiana
2. A.K. Joshi and B.D. Singh. 2005. *Seed Technology*. Kalyani Publishers, New Delhi.
3. Maloo, S.R., Intodia, S.K. and Pratap Singh. 2008. *Beej Pradyogiki*. Agrotech Publishing Academy.
4. Dhirenra Khare and Mohan S. Bhale. 2000. *Seed Technology*. Scientific Publishers (India), Jodhpur.

Web Source:

1. <https://agriinfo.in/botany/18/>
2. <http://coursesonline.iasri.res.in/Courses/Principles%20of%20Seed%20Technology/GPBR112/Start%20to%20read%20the%20Course.html>
3. http://agritech.tnau.ac.in/seed_certification/seedtech_index.html

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



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Medi-Caps University, Indore

Syllabus
IV Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO28	Problematic Soils and their Management	2	-	0	2	2

Course Objectives:

1. To understand importance of soil in crop production
2. To gain complete knowledge about Reclamation of Saline, sodic and Acid soils,
3. To gain technical knowledge of Irrigation water quality
4. To understand Remote sensing technology in agriculture
5. To understand land suitability classification.

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Soil quality

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

Unit-2:-management of soil

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

Unit-3:- Irrigation water quality

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

Unit-4:-Remote sensing

Remotesensing and GIS in diagnosis and management of problem soils

Unit-5:-land capability

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

Case Studies:

Optional

Project:

Optional.

Course Outcomes:

1. Student will be familiarized with the importance of soil in crop production
2. Student will come to know about Reclamation of Saline, sodic and Acidsoils,
3. Student will come to know about the Irrigation water quality
4. Student will know the Remote sensing technology in agriculture
5. Student will come to know about land suitability classification.

Text Books:

1. *USDA Handbook No. 60. 1954. Diagnosis and improvement of Saline and Alkali Soils. Oxford & IBH.*
2. *Abrol, I.P. and Dhurvanarayana, V.V. (1998) Technologies for wasteland development, ICAR, New Delhi-110012*
3. *Cirsan Paul, J.(1985) Principles of remote sensing. Longman, New York.*
4. *Somani, L.L. and Totawat, K.L. (1993). Management of salt affected soils and waters. Agrotech publishing Academy, Udaipur.*
5. *Agarwal, R.R., Yadav, J.S.P. and Gupta, R.N. (1982). Saline Alkali soils of India, ICAR, New Delhi.*
6. *ISSS (2009) Fundamentals of Soil Science, Div. of Soil Science, IARI, New Delhi*

Reference Books:

1. Bear FE. 1964. Chemistry of the Soil. Oxford & IBH.
2. Jurinak JJ. 1978. Salt-affected Soils. Department of Soil Science & Biometeorology. Utah State Univ.
3. Richards, L.A. (1954). Diagnosis and improvement of saline and alkali soils. USDA Hand book No. 60, Washington, DC USA.

Web Source:

1. <https://agriinfo.in/soil-science/24/>
2. http://ecoursesonline.iasri.res.in/Courses/Bsc_Agri_index.html

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
IV Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO29	Production Technology for Fruit and Plantation Crops	1	-	2	3	2

Course Objectives:

1. To understand Importance fruit and plantation crop
2. To gain complete knowledge about cultivation of major fruits-mango, banana, citrus, grape, guava.
3. To gain technical knowledge of cultivation of major fruits-litchi, papaya, sapota.
4. To understand cultivation of date, ber, pineapple, pomegranate, jackfruit, strawberry.
5. To gain knowledge about cultivation of plantation crops.

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Importance fruit and plantation crop

Importance and scope of fruit and plantation crop industry in India; Importance of rootstocks

Unit-2:-cultivation of major fruits I

Production technologies for the cultivation of major fruits-mango, banana, citrus, grape, guava

Unit-3:-cultivation of major fruits II

Production technologies for the cultivation of major fruits-litchi, papaya, sapota, apple, pear, peach, walnut, almond

Unit-4:-cultivation of minor fruits

Production technologies for the cultivation of minor fruits- date, ber, pineapple, pomegranate, jackfruit, strawberry

Unit-5:-cultivation of plantation crops

Production technologies for the cultivation of plantation crops-coconut, arecanut, cashew, tea, coffee & rubber.

Case Studies:

Optional

List of Practicals:

1. Seed propagation. Scarification and stratification of seeds.
2. Propagation methods for fruit and plantation crops.
3. Description and identification of fruit.
4. Preparation of plant bio regulators and their uses
5. Important pests, diseases and physiological disorders of above fruit and plantation
a. crops
6. Visit to commercial orchards.

Project:

Optional.

Course Outcomes:

1. Student will be familiarized with the importance of fruit and plantation crop.
2. Student will come to know about cultivation of major fruits-mango, banana, citrus, grape, guava.
3. Student will come to know about the cultivation of major fruits-litchi, papaya, sapota
4. Student will know the cultivation of date, ber, pineapple, pomegranate, jackfruit, strawberry.
5. Student will come to know about cultivation of plantation crops.

Text Books:

- 1 Bal, J.S. Fruit Growing (2010) Kalyani Publishers
- 2 Banday F.A. and Sharma M.K. Advances in Temperate Fruit Production (2010) Kalyani Publishers
- 3 Bose, T.K., Mitra, S.K. and Sanyal, D. Tropical and Sub-Tropical-Vol-I (2002) Nayaprakash, Kolkata
- 4 Chadha, T.R Text Book of Temperate Fruits (2001) ICAR Publication
- 5 Chattopadhyay T.K. A text book on Pomology-IV Devoted to Temperate fruits (2009) Kalyani Publishers
6. S.P. Singh Commercial fruits (2004) Kalyani Publishers

Reference Books:

1. Das B.C and Das S.N . Cultivation of Minor Fruits Kalyani Publishers
2. K.L.Chadda Advanced in Horticulture (2009) Malhotra Publishing House, New Delhi
3. Kumar, N.J.B. M. Md. Abdul Khaddar, RangaSwamy, P. and Irrulappan, I. Introduction to spices, Plantation crops and Aromatic plants (1997) Oxford & IBH, New Delhi
4. W S Dhillon Fruit Production in India (2013) Narendra Publishing House

Web Source:

3. <https://agriinfo.in/horticulture/65/>
4. <http://ecoursesonline.iasri.res.in/Courses/Protected%20Cultivation%20&%20Post%20Harvest%20Technology/AENG252/Start%20to%20read%20the%20Course.html>
5. http://agritech.tnau.ac.in/horticulture/horti_index.html

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/course.php>



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Medi-Caps University, Indore

Syllabus
IV Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO26	Production Technology for Ornamental Crops, MAP and Landscaping	1	-	2	3	2

Course Objectives:

1. To understand Importance and scope of ornamental crops.
2. To gain complete knowledge about Production technology cut flowers.
3. To gain technical knowledge of Package of practices loose flowers.
4. To understand Production technology medicinal plants
5. To gain knowledge about Processing and value addition

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-introduction of ornamental crops

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

Unit-2:-Production technology cutflowers

Production technology of important cupflowers like rose, gerbera, carnation, liliun and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions.

Unit-3:- Package of practices loose flowers

Package of practices for loose flowers like marigold and jasmine under open conditions.

Unit-4:-Production technology medicinal plants

Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver.

Unit-5:-Processing and value addition

Processing and value addition in ornamental crops and MAPs produce.

Case Studies:

Optional

List of Practicals:

1. Identification of Ornamental plants.
2. Identification of Medicinal and Aromatic Plants. Nursery

3. bed preparation and seed sowing.
4. Training and pruning of Ornamental plants.
5. Planning and layout of garden.
6. Bed preparation and planting of MAP.
7. Protected structures – care and maintenance.
8. Intercultural operations in flowers and MAP.
9. Harvesting and post harvest handling of cut and loose flowers.
10. Processing of MAP.
11. Visit to commercial flower/MAP unit.

Project:

Optional.

Course Outcomes:

- a) Student will come to know Importance and scope of ornamental crops.
- b) Student will come to know about the Production technology cut flowers.
- c) Student will know the Package of practices loose flowers.
- d) Student will know the Production technology medicinal plants.
- e) Student will come to know about Processing and value addition.

Text Books:

1. *A.K. Tiwari and R. Kumar Fundamentals of ornamental horticulture and landscape gardening (2012) New India*
2. *Arora, J.S. Introductory Ornamental Horticulture (2006) Kalyani Publishers*
3. *Atal, E. K. and Kapur, B. Cultivation and Utilization of Medicinal and Aromatic plants (1982) CSIR, New Delhi*
4. *Azhar Ali Farooqui and Sreeramu, B.S. Cultivation of medicinal and aromatic plants (2001) Unitd Press Limited*
5. *Bimaldas Chowdhury and Balai Lal Jana Flowering Garden trees (2014) Pointer publishers, Jaipur*
6. *Bose, T.K. Malti, R.G. Dhua, R.S. & Das, P. Floriculture and Landscaping (2004) Nayaprakash*

Reference Books:

1. *H.S.Grewal and Parminder Singh Landscape designing and ornamental plants (2014)*
2. *K.V.Peter. Ornamental plants (2009) New India publishing agency*
3. *Bose, T.K. and Mukherjee, D. Gardening in India (2004) Oxford & IBH Publishers*
4. *Randhawa, G.S. AmitabhaMukhopadhyay Floriculture in India (2004) Allied Publishers Pvt. Ltd., New Delhi*
5. *Chadha, K.L. and Chaudhary, B. Ornamental Horticulture in India, ICAR*

Web Source:

1. <https://agriinfo.in/horticulture/>
2. <http://ecoursesonline.iasri.res.in/Courses/Production%20Technology%20of%20Vegetables%20&%20Flowers/HORT281/Start%20to%20read%20the%20Course.html>

Open Learning Source:

3. <https://www.agmoocs.in/courses>
4. <https://nptel.ac.in/course.php>



Syllabus
IV Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO27	Renewable Energy and Green Technology	1	-	2	3	2

Course Objectives:

1. To understand Energy sources
2. To gain complete knowledge about bioenergy resource,
3. To understand **Biogas** plants and gasifiers, biogas, bio alcohol, biodiesel
4. To understand Application of solar energy
5. To gain knowledge about wind energy and their application.

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Energy sources

Classification of energy sources, contribution of these of sources in agricultural sector,
Familiarization with biomass utilization for biofuel production and their application,

Unit-2:-Biogas

Familiarization with types of biogas plants and gasifers, biogas, bioalcohol, biodiesel and biooil production and their utilization as bioenergy resource,

Unit-3:-solar energy

Introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater,

Unit-4:-Application of solar energy

Application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic systemand their application,

Unit-5:-wind energy


Introduction of wind energy and their application.

Case Studies:

Optional

List of Practicals:

1. Familiarization with renewable energy gadgets.
2. To study biogas plants,

- 
3. To study gasifier
 4. To study the production process of biodiesel
 5. To study briquetting machine

 6. To study the production process of bio-fuels.
 7. Familiarization with different solar energy gadgets.
 8. To study solar photovoltaic system: solar light, solar pumping, solar fencing.
 9. To study solar cooker
 10. To study solar drying system.
 11. To study solar distillation and solar pond.

Project:

Optional.

Course Outcomes:

- a) Student will be familiarized with the importance of Energy sources
- b) Student will come to know about biogas plants
- c) Student will come to know about the Biogas plants and gasifiers, biogas, bio alcohol, biodiesel.
- d) Student will know the Application of solar energy
- e) Student will come to know about wind energy and their application.

Text Books:

1. G.D. Rai. Non-Conventional Energy Sources, Kh Publishers, New Delhi.
2. N. S. Rathore. A.K. Kurchania, N.L. Panwar. (2007). Non Conventional Energy Sources, Himanshu Publications.

Reference Books:

- L. N.S. Rathore. A. K. Kurchania, N.L. Panwar. (2007). Renewable Energy, Theory and Practice, Himanshu Publications.
- M. K.C. Khandelwal. & S.S. Mandi. (1990). Biogas Technology.

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Renewable%20Energy/AENG352/Start%20to%20read%20the%20Course.html>
2. <http://vikaspedia.in/agriculture>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
Elective course

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3EL01	Agri-business Management	2	-	2	4	3

Course Objectives:

1. To understand Agri-business Management.
2. To gain complete knowledge about Agro-based industries.
3. To gain knowledge of **Planning**, policies procedures, Components of a business plan.
4. To understand Organization staffing, directing and motivation.
5. To gain knowledge about Consumer behaviour analysis.

Prerequisites :12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction of Agri-business Management

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

Unit-2:-Agro-based industries.

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

Unit-3:-Planning

Planning, meaning, definition, types of plans. Purpose or mission, goals or objectives, Strategies, policies procedures, rules, programs and budget. Components of a business plan, Steps in planning and implementation.

Unit-4:-Organization staffing

Organization staffing, directing and motivation. Ordering, leading, supervision, communications, control. Capital Management and Financial management of Agribusiness. Financial statements and their importance. Marketing Management: Segmentation, targeting & positioning. Marketing mix and marketing strategies.

Unit-5:-Consumer behaviour analysis

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

Case Studies:

Optional

List of Practicals:

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

Project:

Optional.

Course Outcomes:

- A. Student will come to know about **Agri-business Management**.
- B. Student will be familiarized with the importance of **Agro-based industries**.
- C. Student will come to know about the **Planning**, policies procedures, Components of a business plan.
- D. Student will know the **Organization staffing, directing and motivation**.
- E. Student will come to know about **Consumer behaviour analysis**.

Text Books:

1. *G. L. Meena, S. S. Burark, D. C. Pant and Rajesh Sharma, 2017. Fundamentals Agribusiness Management, Agrotech Publishing Academy, Udaipur, ISBN: 978-81- 8321-418-6. First edition.*
2. *Kotler, Philip, 1999, Marketing Management, Prentice Hall of India, New Delhi,*

3. Mamoria, C. B., Joshi, R. L. and Mulla, N. I. 2005, *Principles and Practices of Marketing in India*, Kitab Mahal, Allahabad.
4. Sudha, G.S, 2000, *Business Management*, RBSA Publishers, Jaipur.
5. Tripathi, P. C. and Reddy, P. N, *Principles of Management*, Tata McGraw Hill Education Private Limited, New Delhi, 2008.

Reference Books:

1. Gittinger, J.P, 1984, *Economic Analysis of Agricultural Projects*, John Hopkins University Press.
2. L.L. Somani and G. L. Meena, 2017. *Agribusiness & Farm Management at a Glance, Vol-2, Basic & Applied Fundamentals*, Agrotech Publishing Academy, Udaipur, ISBN: 978-81-8321-429-2. Second edition.

Web Source:

1. http://agritech.tnau.ac.in/agricultural_marketing/agribusi.html
2. <http://csauk.ac.in/agri-business-management/>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>

Medi-Caps University, Indore
Faculty of Agriculture
Model New Scheme as per Medi-Caps University

Third Year (Odd Semester - V Sem)						
Sr. No.	Subject Code	Courses	L	T	P	Credit
1	AG3CO34	Principles of Integrated Pest and Disease Management	2	0	1	3
2	AG3CO35	Manures, Fertilizers and Soil Fertility Management	2	0	1	3
3	AG3CO36	Pests of Crops and Stored Grain and their Management	2	0	1	3
4	AG3CO37	Diseases of Field and Horticultural Crops and their Management -I	2	0	1	3
5	AG3CO38	Crop Improvement-I (<i>Kharif Crops</i>)	1	0	1	2
6	AG3CO40	Geoinformatics and Nano-technology and Precision Farming	1	0	1	2
7	AG3CO41	Practical Crop Production – I (<i>Kharif crops</i>)	0	0	2	2
8	AG3CO42	Intellectual Property Rights	1	0	0	1
9	AG3SE03	Entrepreneurship Development and Business Communication	1	0	1	2
10	AG3EL07	Protected Cultivation	2	0	1	3
		Total	14	0	10	24



Syllabus
V Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO38	Crop Improvement-I (<i>Kharif</i> Crops)	1	-	2	3	2

Course Objectives:

1. To understand *Centers of origin, distribution of species.*
2. To gain complete knowledge about concepts of breeding
3. To gain technical knowledge of Development of hybrids
4. To understand Hybrid seed production technology in *Maize, Rice, Sorghum, Pearl millet and Pigeon pea*
5. To gain knowledge about *Ideotype concept*

Prerequisites: 12th pass

Co-requisites: Nil

Curriculum:

Unit-1: - Centres of origin

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

Unit-2: - Plant genetic resources and breeding concepts

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

Unit-3:- Development of varieties and hybrids

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

Unit-4: - Hybrid seed production

Hybrid seed production technology in *Maize, Rice, Sorghum, Pearl millet and Pigeon pea, etc.*

Unit-5: - Ideotype and future varieties

Ideotype concept and climate resilient crop varieties for future.

Case Studies:

Optional

List of Practicals:

1. Floral biology, emasculation and hybridization techniques in different crop species; *viz., Rice, Jute, Maize, Sorghum, Pearl millet, Ragi, Pigeonpea, Urdbean, Mungbean, Soybean, Groundnut*

2. Floral biology, emasculation and hybridization techniques in different crop species; viz., Sesame, Caster, Cotton, Cowpea, Tobacco, Brinjal, Okra and Cucurbitaceous crops.
3. Maintenance breeding of different *kharif* crops.
4. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods
5. Study of field techniques for seed production and hybrid seeds production in *Kharif* crops
6. Estimation of heterosis, inbreeding depression and heritability
7. Layout of field experiments; Study of quality characters, donor parents for different characters
8. Visit to seed production plots
9. Visit to AICRP plots of different field crops.

Project:

Optional.

Course Outcomes:

- A. Student will come to know about *Centers of origin, distribution of species*.
- B. Student will come to know about the concepts of breeding
- C. Student will be familiarized with the importance of **Development of hybrids**
- D. Student will know the **Hybrid seed production**
- E. Student will come to know about *Ideotype concept*

Text Books:

1. Chopra, V.L. 2000. *Breeding of Field Crops (Edt.). Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.*
2. Chaddha. K.L. and Rajendra Gupta. 1995. *Vol. II Medicinal and Aromatic Plant. Malhotra Publishing House, New Delhi.*
3. Manjit S. Kang 2004. *Crop Improvement: Challenges in the Twenty-First Century (Edt). International Book Distributing Co. Lucknow.*
4. Ram, H.H. and H.G. Singh. 1994. *Crop Breeding and Genetics. Kalyani Publishers, New Delhi.*
5. Sharma, A.K. 2005. *Breeding Technology of Crop Plants (Edt.). Yash Publishing House, Bikaner.*
6. Shekhawat, S. S. (ed) (2016). *Advances and Current Issues in Agriculture, Vol. III. Shiksha Prakashan, S. M. S. Highway, Jaipur.*

Reference Books:

1. Ram, H.H. and H.G. Singh. 1994. *Crop Breeding and Genetics. Kalyani Publishers, New Delhi.*
2. Ram. H.H. 2005. *Vegetable Breeding — Principles and Practices. Kalyani Publishers, New Delhi.*
3. Poehlman, J.M. 1987. *Breeding of Field Crops. AVI Publishing Co. INC, East Port, Conneacticut, USA.*
4. Mandal, A. K., P.K. Ganguli and S.P. Banerjee. 1991. *Advances in Plant Breeding. Vol. I and II. CBS Publishers and Distributors, New Delhi.*

Web Source:

1. <https://agriinfo.in/botany/60/>
2. http://ecoursesonline.iasri.res.in/Courses/Bsc_Agri_index.html

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/course.php>



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO37	Diseases of Field and Horticultural Crops and their Management -I	2	-	2	4	3

Course Objectives:

6. To understand etiology, disease cycle and management of, diseases of *Rice, Maize, Bajra*
7. To gain complete knowledge about etiology, disease cycle and management of, diseases of *Soybean, Pigeonpea, black & green gram*
8. To gain knowledge of about etiology, disease cycle and management of, diseases of *Guava, Banana, Papaya, Pomegranate*
9. To understand etiology, disease cycle and management of, diseases, of *Cruciferous vegetables:*
10. To gain knowledge about etiology, disease cycle and management of, diseases, of *Ginger, Colocasia, Coconut*

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Diseases of Field Crops I

Symptoms, etiology, disease cycle and management of major diseases of following crops: Field Crops: Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro; Maize: stalk rots, downy mildew, leaf spots; Sorghum: smuts, grain mold and anthracnose, Bajra :downy mildew and ergot; Groundnut: early and late leaf spots, wilt

Unit-2:- Diseases of Field Crops II

Symptoms, etiology, disease cycle and management of major diseases of following crops: Field Crops: Soybean: Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic; Pigeonpea: Phytophthora blight, wilt and sterility mosaic; Finger millet: Blast and leaf spot; black & green gram: Cercospora leaf spot and anthracnose, web blight and yellow mosaic Castor: Phytophthora blight; Tobacco: black shank, black root rot and mosaic

Unit-3:- Diseases of Field Crops III

Symptoms, etiology, disease cycle and management of major diseases of following crops: Horticultural Crops: Guava: wilt and anthracnose; Banana: Panama wilt, bacterial wilt, Sigatoka and bunchy top; Papaya: foot rot, leaf curl and mosaic, Pomegranate: bacterial blight

Unit-4:- Diseases of Field Crops IV

Symptoms, etiology, disease cycle and management of major diseases of following crops: Cruciferous vegetables: Alternaria leaf spot and black rot; Brinjal: Phomopsis blight and fruit rot

and Sclerotinia blight; Tomato: damping off, wilt, early and late blight, buck eye rot and leaf curl and mosaic; Okra: Yellow Vein Mosaic; Beans: anthracnose and bacterial blight

Unit-5: - Diseases of Field Crops V

Symptoms, etiology, disease cycle and management of major diseases of following crops:
Ginger: soft rot; Colocasia: Phytophthora blight; Coconut: wilt and bud rot; Tea: blister blight;
Coffee: rust

Case Studies:

Optional

List of Practicals:

10. Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory.
11. Field visit for the diagnosis of field problems
12. Collection and preservation of plant diseased specimens for Herbarium;
Note: Students should submit 50 pressed and well mounted specimens.

Project:

Optional.

Course Outcomes:

- F. Student will be familiarized with the diseases of *Rice, Maize, Bajra*
- G. Student will come to know about diseases of Soybean, Pigeonpea, black & green gram
- H. Student will come to know about the *Guava, Banana, Papaya, Pomegranate*
- I. Student will know the diseases, of Cruciferous vegetables:
- J. Student will come to know about diseases, of *Ginger, Colocasia, Coconut*

Text Books:

1. Gupta V K and Paul, Y S 2008. IInd ed. Diseases of field crops. Kalyani Publishing Co. ND.
2. Mehrotra R S and Aggarwal A. 2012. 12th ed. Plant Pathology, Tata McGraw-Hill Publishing Co Ltd.
3. Rangaswamy,G and Mahadevan, A . 2012. 4th ed. Diseases of crop plants in India. Prentice hall of India Pvt Ltd, New Delhi.
4. Singh R S .2007. 8th ed. Plant Diseases. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi
5. Gupta ,V. K. 2014. Diseases of Fruit Crops. Kalyani Publishers
6. Singh , R.P. 2013. *Plant Pathology*. Kalyani Publishers
7. Tripathi, D.P. 2009. *Crop Diseases*, Kalyani Publishers
8. Gupta, S.K. and Thind, T.S. 2006. *Disease problems in vegetable production*. Scientific Publishers, Jodhpur.
9. Singh, R.S. 2006. *Diseases of fruit crops*. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.

Reference Books:

5. Mishra A , Bohra A and Mishra , A. 2005. *Plant Pathology*. Agrobios. Jodhpur (India).
6. Singh R S .2007. *Plant Diseases*.(9th Ed.) Oxford and IBH Publishing Co.Pvt .Ltd .ND
7. Gangawane, L.V. and Khilare, V.C. 2008. *Crop diseases identification and management*. Daya publishing house, New Delhi.
8. Pathak, V.N. 1980 *Diseases of fruit crops*. Oxford and IBH Publishing Co. Pvt. Ltd, . New Delhi.
9. Singh, R.S.1994 *Diseases of vegetable crops*. Oxford and IBH Publishing Co. Pvt. Ltd

Web Source:

1. <https://agriinfo.in/plant-pathology/62/>
2. <http://ecoursesonline.iasri.res.in/Courses/Diseases%20of%20Field%20Crops%20and%20Their%20Management/PATH%20272/Start%20to%20read%20the%20Course.html>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



Syllabus

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3SE03	Entrepreneurship Development and Business Communication	1	-	2	3	2

Course Objectives:

11. To understand Entrepreneurship.
12. To gain knowledge about *Entrepreneurship Development*.
13. To gain technical knowledge of *Business Leadership Skills*.
14. To understand **Project Planning**.
15. To gain knowledge about *Agri entrepreneurship*.

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Introduction of Entrepreneurship

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

Unit-2:- Entrepreneurial Development

Impact of economic reforms on Agribusiness/ Agri enterprises, Entrepreneurial Development Process; Business Leadership Skills; Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation)

Unit-3:- Business Leadership Skills

Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skill, Supply chain management and Total quality management

Unit-4:- Project Planning

Project Planning Formulation and report preparation;

Unit-5:- Agri entrepreneurship

Financing of enterprise, Opportunities for Agri entrepreneurship and rural enterprise.

Case Studies:

Optional

List of Practicals:

13. Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement motivation, exercise in creativity, time audit through planning, monitoring and supervision, identification

14. Selection of business idea, preparation of business plan and proposal writing,
15. Visit to entrepreneurship development institute and entrepreneurs.

Project:

Optional.

Course Outcomes:

- K. Student will be familiarized with the importance of ***Entrepreneurship***
- L. Student will come to know about *Entrepreneurship Development*.
- M. Student will come to know about the ***Business Leadership Skills***.
- N. Student will know the **Project Planning**.
- O. Student will come to know about ***Agri entrepreneurship***.

Text Books:

1. Harold Koontz & Heinz Weihrich. 2004. *Essentials of Management: An International erspective, 2nd Ed.* Tata Mc-Graw Hill Publishing Pvt Ltd.
2. Bhaskaran, S. 2014. *Entrepreneurship Development and Management.* Aman Publishing House, Meerut.
3. Khanka S S. 1999. *Entrepreneurial Development.* S. Chand and Co. New Delhi.
4. Mohanty S K. 2007. *Fundamentals of Entrepreneurship.* Prentice Hall India Ltd., New Delhi.
5. Balasubrmnyam M. 1985. *Business Communication.* Vani Educational Books, New Delhi.

Reference Books:

10. Chole, R. R. Kapse, P. S. and Deshmukh, P. R. 2012. *Entrepreneurship Development and Communication Skills scientific Publisher (India), Jodhpur.*
11. Natrajan, K. and Ganeshan, K.P. 2012. *Principles of Management.* Himalaya Publishing House, New Delhi.
12. Mukesh Pandey & Deepali Tewari. 2010. *The Agribusiness Book.* IBDC Publishers.

Web Source:

1. <https://k8449r.weebly.com/uploads/3/0/7/3/30731055/communication.pdf>
2. <http://www.scientificpub.com/upload/pdf/414.pdf>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



Syllabus
V Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO40	Geoinformatics and Nano-technology and Precision Farming	1	-	2	3	2

Course Objectives:

16. To understand *Precision agriculture*
17. To gain complete knowledge about Remote sensing concepts and application in agriculture
18. To gain technical knowledge of *Crop Simulation Models*
19. To understand *Nanotechnology*.
20. To gain knowledge about *Nano-fertilizers*

Prerequisites: 12th pass

Co-requisites: Nil

Curriculum:

Unit-1: Introduction of Precision agriculture

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

Unit-2: - Soil mapping

Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; Spatial data and their management in GIS; Remote sensing concepts and application in agriculture

Unit-3: - Crop Simulation Models

Image processing and interpretation; Global positioning system (GPS), components and its functions; Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs;

Unit-4: - Nanotechnology

STCR approach for precision agriculture; Nanotechnology, definition, concepts and techniques

Unit-5: - Nano-fertilizers

Brief introduction about nanoscale effects, nano-particles, nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in seed, water, fertilizer, plant protection for scaling-up farm productivity

Case Studies:

Optional

List of Practicals:

16. Introduction to GIS software, spatial data creation and editing.
17. Introduction to image processing software.
18. Visual and digital interpretation of remote sensing images
19. Generation of spectral profiles of different objects
20. Supervised and unsupervised classification and acreage estimation.

21. Multispectral remote sensing for soil mapping.
22. Creation of thematic layers of soil fertility based on GIS.
23. Creation of productivity and management zones.
24. Fertilizers recommendations based of VRT and STCR techniques.
25. Crop stress (biotic/abiotic) monitoring using geospatial technology.
26. Use of GPS for agricultural survey.
27. Formulation, characterization and applications of nanoparticles in agriculture.
28. Projects formulation and execution related to precision farming.

Project:

Optional.

Course Outcomes:

- P. Student will be familiarized with the importance of Precision agriculture
- Q. Student will come to know about application of *Remote sensing in agriculture*
- R. Student will come to know about the **Crop Simulation Models**
- S. Student will know the *Nanotechnology*.
- T. Student will come to know about *Nano-fertilizers*.

Text Books:

1. Krishna, K.K. 2013. *Precision Farming: Soil Fertility and Productivity Aspects*. Apple Academic Press
2. Srivastava, G.S. 2014. *An Introduction to Geoinformatics*. McGrew Hill Education (India) Pvt. Ltd. , New Delhi
3. Gupta, R.K. and Subhash Chander. 2008. *Principles of Geoinformatics*. Jain Brothers, New Delhi.

Reference Books:

13. Choudhary, S. 2011. *Applied Nanotechnology in Agriculture*. Arise Publishers & Distributors
14. Sekhon, B.S. 2014. *Nanotechnology in agri-food production: an overview*. *Nanotechnology, Science and Applications* 7:31-532.

Web Source:

1. <http://geoinformatics.com/precision-agriculture/>
2. https://www.researchgate.net/publication/200043318_Precision_Farming_with_Geoinformatics_A_New_Paradigm_for_Agricultural_Production_in_a_Developing_Country

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://nptel.ac.in/course.php>



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
V Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO42	Intellectual Property Rights	1	-	0	1	1

Course Objectives:

21. To understand **Intellectual Property Rights**
22. To gain complete knowledge about Industrial design, Geographical indications, integrated circuits, Trade secrets.
23. To gain technical knowledge of **Patentability**.
24. To understand **Plant breeders' rights**.
25. To gain knowledge about **Biological Diversity**.

Prerequisites: 12th pass

Co-requisites: Nil

Curriculum:

Unit-1: - Introduction of intellectual property

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

Unit-2: - IPR in India

Types of Intellectual Property and legislations covering IPR in India:-Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets. Patents Act 1970 and Patent system in India,

Unit-3: - Patentability and procedure.

Patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database.

Unit-4: - Plant breeders' rights

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

Unit-5: - Biological Diversity

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

Case Studies:

Optional

List of Practicals: Na**Project:**

Optional.

Course Outcomes:

- U. Student will come to know about **Intellectual Property Rights**
- V. Student will come to know about the Industrial design, Geographical indications, integrated circuits, Trade secrets.
- W. Student will be familiarized with the importance of **Patentability, process**
- X. Student will know the **Plant breeders' rights,**
- Y. Student will come to know about **Biological Diversity.**

Text Books:

1. *Indian Forestry- K. Manikandan and S. Prabhu*
2. *Principles and practices of silviculture- A.P. Dwivedi*
3. *A text book of forestry- B.S. Chundawat and S.K. Gouatam*

Reference Books:

15. *A hand book of forestry- S.S. Negi*
16. *Plantation Trees- R.K. Luna*

Web Source:

1. https://www.wipo.int/edocs/pubdocs/en/intproperty/450/wipo_pub_450.pdf
2. <https://www.lecturenotes.in/subject/448/intellectual-property-rights-ipr>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/course>



Syllabus
V Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO35	Manures, Fertilizers and Soil Fertility Management	2	-	2	4	3

Course Objectives:

26. To understand organic manures
27. To gain complete knowledge about **fertilizers**.
28. To gain technical knowledge of deficiency and toxicity symptoms of essential plant nutrients,
29. To understand Soil fertility evaluation, Soil testing.
30. To gain knowledge about Methods of fertilizer application of crops

Prerequisites: 12th pass

Co-requisites: Nil

Curriculum:

Unit-1: - Introduction of organic manures

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

Unit-2: - fertilizers

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

Unit-3: - soil fertility

History of soil fertility and plant nutrition. criteria of essentiality. role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants.

Unit-4: - Forms of nutrients in soil

Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil.
Forms of nutrients in soil

Unit-5: - Plant analysis,

Plant analysis, rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

Case Studies:

Optional

List of Practicals:

29. Introduction of analytical instruments and their principles, calibration and applications, Colorimetry and flame photometry.
30. Estimation of soil organic carbon,
31. Estimation of alkaline hydrolysable N in soils.
32. Estimation of soil extractable P in soils.
33. Estimation of exchangeable K; Ca and Mg in soils
34. Estimation of soil extractable S in soils.
35. Estimation of DTPA extractable Zn in soils.
36. Estimation of N in plants.
37. Estimation of P in plants.
38. Estimation of K in plants.
39. Estimation of S in plants.

Project:

Optional.

Course Outcomes:

- Z. Student will come to know about **organic manures**
- AA. Student will come to know about the **fertilizers**
- BB. Student will know the deficiency and toxicity symptoms of essential plant nutrients,
- CC. Student will know the Soil fertility evaluation, Soil testing.
- DD. Student will come to know about Methods of fertilizer application of crops

Text Books:

1. Biswas, T.D. and Mukherjee, S.K. (2006) *Text book of soil science.* Tata McGraw Hill publishing Co. Ltd, New Delhi
2. Das, D.K. (2002) *Introductory Soil Science*, Kalyani publisher, New Delhi
3. Rai, M.M. (2002) *Principal of Soil Science*, Mac Millan India Ltd, New Delhi
4. Jackson, M.L. (1973) *Soil chemical analysis*, Prentice Hall of India, Pvt. Ltd New Delhi
5. Singh Dhyani, Chhonkar, P.K. and Dwivedi V.S. (2005) *Manul on Soil Plant and water analysis.* Westville Publishing House, New Delhi
6. Singh Vinay (1996) (Hindi) *Soil Science, fertilizer & Manures* , V.K. Prakashan Barot Merrut U.P)
7. Yawalkar, K.S. and Agarwal. J.P. (1992). *Manure and fertilizers.* Agriculture Horticulture Publishing House, Nagpur.

Reference Books:

17. Mehra R.K. (2004) *Text book of Soil Science*, ICAR New Delhi
18. ISSS (2002) *Fundamental of Soil Science Div. of Soil Science*, IARI, New Delhi
19. Tisdale, S.L. Nelson, W.L. Beaton, J.D. and Havlin, J.L. (1991) *Soil fertility and fertilizers (5th ed.)*. Prentice Hall of India, Pvt .Ltd, New Delhi.
20. Piper, C.S. (1950) *Soil and Plant analysis*, .Hans publications, Bombay

Web Source:

1. <https://agriinfo.in/soil-science/61/>
2. <http://ecoursesonline.iasri.res.in/Courses/Manures%20Fertilizers%20&%20Agrochemicals/SSAC222/Start%20to%20read%20the%20Course.html>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



Syllabus
V Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO36	Pests of Crops and Stored Grain and their Management	2	-	2	4	3

Course Objectives:

31. To understand nature and type of damage by different arthropods pests
32. To gain complete knowledge about Management of major pests
33. To gain technical knowledge of control practice other important arthropod pests
34. To understand losses of stored grain
35. To gain knowledge about principles of grain store management

Prerequisites: 12th pass

Co-requisites: Nil

Curriculum:

Unit-1: - Arthropods pests.

General account on nature and type of damage by different arthropods pests. Scientific name, order, family, host range, distribution, biology and bionomics, nature of damage

Unit-2: - Management of major pests

Management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various fie Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management crop, vegetable crop, fruit crop

Unit-3: - control practice other important arthropod pests

Management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various, plantation crops, ornamental crops, spices and condiments

Unit-4: - losses of stored grain

Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain.

Unit-5: - principles of grain store management

Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management

Case Studies:

Optional

List of Practicals:

40. Identification of different types of damage.
41. Identification and study of life cycle and seasonal
42. History of various insect pests attacking crops and their produce:
(a) Field Crops; (b) Vegetable Crops; (c) Fruit Crops; (d) Plantation, gardens, Narcotics, spices & condiments.
43. Identification of insect pests and Mites associated with stored grain.
44. Determination of insect infestation by different methods.
45. Assessment of losses due to insects.
46. Calculations on the doses of insecticides application technique.
47. Fumigation of grain store / godown. Identification of rodents and rodent bcontrol operations in godowns.
48. Identification of birds and bird control operations in godowns.
49. Determination of moisture content of grain.
50. Methods of grain sampling under storage condition.
51. Visit to Indian Storage Management and Research Institute, Hapur and Quality Laboratory, Department of Food., Delhi. Visit to nearest FCI godowns.

Project:

Optional.

Course Outcomes:

- EE. Student will come to know type of damage by different arthropods pests
FF. Student will come to know about the Management of major pests
GG. Student will know the control practice other important arthropod pests
HH. Student will come to know about losses of stored grain pest
II. Student will come to know about the principles of grain store management

Text Books:

1. Atwal, A.S. and Dhaliwal, G.S. 2002. *Agricultural Pests of South Asia and Their Management*, Kalyani Publishers, New Delhi.
2. Mathur and Upadhyay, 2005. *A Text Book of Entomology*, Aman Publishing House, Meerut.
3. Reddy, P. Parvatha 2010. *Insect, Mite and Vertebrate Pests and their Management in Horticultural Crops*. Scientific Publishers, Jodhpur

Reference Books:

21. Nayar, M.R.G.K. 1986. *Insects and Mites of Crops in India*, ICAR, New Delhi.
22. David, B.V. and Ramamurthy, V.V. 2016. *Elements of Economic Entomology*, 8th Ed. Popular Book Depot, Chennai.
23. Srivastava, K.P. 2004. *A Text Book of Entomology*, Vol.I & II, Kalyani Publishers, New Delhi.

Web Source:

1. <https://agriinfo.in/entomology/23/>
2. <http://ecoursesonline.iasri.res.in/Courses/Crop%20Pests%20&%20Stored%20Grain%20Pests%20&%20their%20Mgmt/ENTO%20331/Start%20to%20read%20the%20Course.html>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



Syllabus
V Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO41	Practical Crop Production – I (<i>Kharif crops</i>)	0	-	4	4	2

Course Objectives:

36. To understand Field preparation, seed, treatment, nursery raising, sowing, nutrient, weed management
37. To gain complete knowledge about harvesting, threshing, drying winnowing, storage and marketing of produce.
38. To gain technical knowledge of seed production, mechanization, resource conservation and integrated nutrient management
39. To understand Insect-pest and disease management technologies.
40. To gain knowledge about Preparation of balance sheet including cost of cultivation, net returns

Prerequisites : 12th pass

Co-requisites : Nil

Case Studies:

Optional

List of Practicals:

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

Project:

Optional.

Course Outcomes:

- JJ. Student will be familiarized with the Field preparation, seed, treatment, nursery raising, sowing, nutrient, weed management
- KK. Student will come to know about harvesting, threshing, drying winnowing, storage and marketing of produce.
- LL. Student will come to know about the seed production, mechanization, resource conservation and integrated nutrient management
- MM. Student will know the Insect-pest and disease management technologies.

NN. Student will come to know about Preparation of balance sheet including cost of cultivation, net returns

Text Books:

1. Reddy, S. R., 2016. *Principles of Agronomy*, Kalyani Publishers, Ludhiana.
2. Singh, S.S. and Singh, Rajesh. 2015. *Principles and Practices of Agronomy* Kalyani Publishers, New Delhi, Kalyani Publishers, Ludhiana.

Reference Books:

24. Balasubramaniyan, P. and Palaniappan, S.P. 2016. *Principles and Practices of Agronomy* Agrobios (India), Jodhpur.
25. Yawalkar, K.S., Agarwal, J.P. and Bokde, S. 2008. *Manures and Fertilizers (10th edition)*, Agri-Horticultural Publishing House, Nagpur.

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Field%20Crops/AGRO302/Start%20to%20read%20the%20Course.html>
2. <http://vikaspedia.in/agriculture/crop-production>

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/course.php>



Syllabus
V Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO34	Principles of Integrated Pest and Disease Management	2	-	2	4	3

Course Objectives:

41. To understand Integrated Pest and Disease Management
42. To gain complete knowledge about Detection and diagnosis of insect pest
43. To gain technical knowledge of Ecological management of crop environment.
44. To understand IPM module
45. To gain knowledge about Important IPM programmes

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Introduction of Integrated Pest and Disease Management

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

Unit-2:- Detection and diagnosis of insect pest

Methods of detection and diagnosis of insect pest and diseases. Calculation and dynamics of economic injury level and importance of Economic threshold level. Methods of control: Host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control.

Unit-3:- Ecological management of crop environment.

Ecological management of crop environment. Introduction to conventional pesticides for the insect pests and disease management. Survey surveillance and forecasting of Insect pest and diseases.

Unit-4:- IPM module

Development and validation of IPM module. Implementation and impact of IPM (IPM module for Insect pest and disease. Safety issues in pesticide uses.

Unit-5:- Important IPM programmes

Political, social and legal implication of IPM. Case histories of important IPM programmes. Case histories of important IPM programmes.

Case Studies:

Optional

List of Practicals:

56. Methods of diagnosis and detection of various insect pests, and plant diseases,
57. Methods of insect pests and plant disease measurement
58. Assessment of crop yield losses
59. Calculations based on economics of IPM
60. Identification of biocontrol agents, different predators and natural enemies.
61. Mass multiplication of Trichoderma, Pseudomonas, Trichogramma, NPV etc.
62. Identification and nature of damage of important insect pests and diseases and their management.
63. Crop (agroecosystem) dynamics of a selected insect pest and diseases.

64. Plan & assess preventive strategies (IPM module) and decision making.
65. Crop monitoring attacked by insect, pest and diseases
66. Awareness campaign at farmers fields.

Project:

Optional.

Course Outcomes:

- OO. Student will be familiarized with the importance of Integrated Pest and Disease Management
- PP. Student will come to know about Detection and diagnosis of insect pest.
- QQ. Student will come to know about the Ecological management of crop environment.
- RR. Student will know the IPM module.
- SS. Student will come to know Important IPM programmes.

Text Books:

1. Atwal, A.S. and Dhaliwal, G.S. 2002. *Agricultural Pests of South Asia and Their Management*, Kalyani Publishers, New Delhi.
2. Mathur and Upadhyay, 2005. *A Text Book of Entomology*, Aman Publishing House, Meerut.
3. Srivastava, K.P. 2004. *A Text Book of Entomology, Vol.I*, Kalyani Publishers, New Delhi.
4. Dhawan, A.K. *Integrated Pest Management*, Scientific Publishers, Jodhpur.

Reference Books:

26. Dhaliwal, G.S. and Ramesh Arora 2001. *Integrated Pest Management. Concepts and Approaches*. Kalyani publishers, New Delhi.
27. Gautam, R.D. *Biological Pest Suppression*, Westvill Publising Co., New Delhi.

Web Source:

1. <https://agriinfo.in/entomology/23/>
2. <https://niphm.gov.in/Recruitments/ASO-Pathology.pdf>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



Syllabus
Elective course

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3EL07	Protected Cultivation	2	-	2	4	2

Course Objectives:

46. To understand **Protected Cultivation**.
47. To gain complete knowledge about **Greenhouse**.
48. To gain technical knowledge of **Propagation material**.
49. To understand **Greenhouse cultivation horticultural crops**.
50. To gain knowledge about **Cultivation of medicinal and aromatic plants**.

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction of Protected Cultivation

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

Unit- 2:-Greenhouse

Greenhouse design, environment control, artificial lights, Automation. Soil preparation and management, Substrate management.

Unit-3:- Propagation material

Types of benches and containers. Irrigation and fertigation management. Propagation and production of quality planting material of horticultural crops.

Unit-4:-Greenhouse cultivation horticultural crops

Greenhouse cultivation of important horticultural crops – rose, carnation, chrysanthemum, gerbera, orchid, anthurium, liliun, tulip, tomato, bell pepper, cucumber, strawberry, pot plants, etc.

Unit-5:-Cultivation of medicinal and aromatic plants

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

Case Studies:

Optional

List of Practicals:

67. Raising of seedlings and saplings under protected conditions,
68. Use of portrays in quality planting material production,
69. Bed preparation and planting of crop for production,
70. Inter cultural operations,
71. Soil EC and pH measurement,
72. Regulation of irrigation and fertilizers through drip,
73. Fogging and misting.

Project:

Optional.

Course Outcomes:

TT. Student will be familiarized with the importance of **Protected Cultivation**.

- UU. Student will come to know about **Greenhouse**.
VV. Student will come to know about the Propagation material.
WW. Student will know the **Greenhouse cultivation horticultural crops**.
XX. Student will come to know about **Cultivation of medicinal and aromatic plants**.

Text Books:

1. *Green house: Science and Technology*. 2016. Kothari S, S.C.Kaushic and A.N.Mathur. Himanshu Publication, Udaipur.
3. *Agricultural Process Engineering*. 1955. Henderson, S.M. and R.L. Perry. John Willy and Sons, New York.

Reference Books:

28. *Principles of Agricultural Engineering, Vol. I*. 2012. Michael, A.M. and T. P. Ojha . Jain Brothers, New Delhi.
2. *Green House Technology- Application and Practice*. Sharma A and V.M.Salokhe. 2006. Agro Tech. publication, Udaipur

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Protected%20Cultivation%20&%20Post%20Harvest%20Technology/AENG252/Start%20to%20read%20the%20Course.html>
2. http://agritech.tnau.ac.in/horticulture/horti_index.html

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/course.php>

Medi-Caps University, Indore
Faculty of Agriculture
Model New Scheme as per Medi-Caps University

Third Year (Even Semester - VI Sem)						
Sr. No.	Subject Code	Courses	L	T	P	Credit
1	AG3CO43	Rainfed Agriculture & Watershed Management	1	0	1	2
2	AG3CO44	Protected Cultivation and Secondary Agriculture	1	0	1	2
3	AG3CO45	Diseases of Field and Horticultural Crops and their Management-II	2	0	1	3
4	AG3CO46	Post-harvest Management and Value Addition of Fruits and Vegetables	1	0	1	2
5	AG3CO47	Management of Beneficial Insects	1	0	1	2
6	AG3CO48	Crop Improvement-II (<i>Rabi crops</i>)	1	0	1	2
7	AG3CO49	Practical Crop Production –II (<i>Rabi crops</i>)	0	0	2	2
8	AG3CO50	Principle of Organic Farming	1	0	1	2
9	AG3CO51	Farm Management, Production & Resource Economics	1	0	1	2
10	AG3CO52	Principles of Food Science and Nutrition	2	0	0	2
11	AG3EL09	Hi- tech Horticulture	2	0	1	3
Total			13	0	11	24



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
VI Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO48	Crop Improvement-II (Rabi crops)	1	-	2	3	2

Course Objectives:

1. To understand To understand *Centers of origin, distribution of species.*
2. To gain complete knowledge about concepts of breeding
3. To gain technical knowledge of Development of hybrids
4. To understand Hybrid seed production technology in *Rabi crops*
5. To gain knowledge about *Ideotype concept*

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1: - Centres of origin

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

Unit-2: - Plant genetic resources

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

Unit-3:- development of varieties and hybrids

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

Unit-4: - Hybrid seed production

Hybrid seed production technology of *Rabi* crops.

Unit-5: - Ideotype and future varieties

Ideotype concept and climate resilient crop varieties for future.

Case Studies:

Optional

List of Practicals:

1. Floral biology, emasculation and hybridization techniques in different crop species namely Wheat, *Oat, Barley, Chickpea, Lentil, Field pea, Rajma, Horse gram, Rapeseed Mustard, Sunflower, Safflower, Potato, Berseem. Sugarcane, Tomato, Chilli, Onion*
2. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods
3. Study of field techniques for seed production and hybrid seeds production in *Rabi* crops
4. Estimation of heterosis, inbreeding depression and heritability
5. Layout of field experiments
6. Study of quality characters
7. Study of donor parents for different characters
8. Visit to seed production plots
9. Visit to AICRP plots of different field crops

Project:

Optional.

Course Outcomes:

- A. Student will come to know about *Centers of origin, distribution of species.*
- B. Student will come to know about the concepts of breeding
- C. Student will be familiarized with the importance of **Development of hybrids**
- D. Student will know the **Hybrid seed production**
- E. Student will come to know about *Ideotype concept*

Text Books:

1. Chopra, V.L. 2000. *Breeding of Field Crops (Edt.). Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.*
2. Manjit S. Kang 2004. *Crop Improvement: Challenges in the Twenty-First Century (Edt) International Book Distributing Co. Lucknow.*
3. Ram, H.H. and H.G. Singh. 1994. *Crop Breeding and Genetics. Kalyani Publishers, New Delhi.*
4. Sharma, A.K. 2005. *Breeding Technology of Crop Plants (Edt.). Yash Publishing House, Bikaner.*
5. Shekhawat, S. S. (ed) (2016). *Advances and Current Issues in Agriculture, Vol. III. Shiksha Prakashan, S. M. S. Highway, Jaipur.*

Reference Books:

1. Ram, H.H. 2005. *Vegetable Breeding — Principles and Practices. Kalyani Publishers, New Delhi.*
2. Mandal, AK., P.K. Ganguli and S.P. Banerjee. 1991. *Advances in Plant Breeding Vol. I and II. CBS Publishers and Distributors, New Delhi.*
3. Chaddha, K.L. and Rajendra Gupta. 1995. *Advances in Horticulture Vol. II Medicinal and Aromatic Plants. Malhotra Publishing House, New Delhi.*

Web Source:

1. https://www.researchgate.net/publication/327544956_CROP_IMPROVEMENT-II_RABI
2. <https://www.amrita.edu/course/crop-improvement-ii-rabi-crops>

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/course.php>



Syllabus
VI Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO45	Diseases of Field and Horticultural Crops and their Management-II	2	-	2	4	3

Course Objectives:

6. To understand Diseases of *Wheat, Sugarcane, Sunflower*.
7. To gain complete knowledge about Diseases of *Mustard, Gram, Sunflower*.
8. To gain knowledge Diseases of horticultural Crops like *Mango, Citrus, Grape vine, Apple*.
9. To understand Diseases of *Strawberry, Cucurbits, Onion and garlic*.
10. To gain knowledge about Diseases of *Chillies, Turmeric, Coriander, Marigold*.

Prerequisites: 12th pass

Co-requisites: Nil

Curriculum:

Unit-1: Diseases of Field crop I

Symptoms, etiology, disease cycle and management of following diseases: Field Crops: Wheat: rusts, loose smut, karnal bunt, powdery mildew, alternaria blight, and ear cockle; Sugarcane: red rot, smut, wilt, grassy shoot, ratoon stunting and Pokkah Boeng, Sunflower: Sclerotinia stem rot and Alternaria blight.

Unit-2: - Diseases of Field crop II

Symptoms, etiology, disease cycle and management of following diseases: Field Crops: Mustard: Alternaria blight, white rust, downy mildew and Sclerotinia stem rot; Gram: wilt, grey mould and Ascochyta blight; Lentil: rust and wilt; Cotton: anthracnose, vascular wilt, and black arm; Pea: downy mildew, powdery mildew and rust.

Unit-3: - Diseases of Field horticultural Crops I

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

Unit-4:- Diseases of Field horticultural Crops II

Horticultural Crops: Strawberry: leaf spot Potato: early and late blight, black scurf, leaf roll, and mosaic; Cucurbits: downy mildew, powdery mildew, wilt; Onion and garlic: purple blotch, and Stemphylium blight; spot.

Unit-5:- Diseases of Field horticultural Crops III

Horticultural Crops: Chillies: anthracnose and fruit rot, wilt and leaf curl; Turmeric: leaf spot Coriander: stem gall Marigold: Botrytis blight; Rose: dieback, powdery mildew and black leaf

Case Studies:

Optional

List of Practicals:

10. Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory.
11. Field visit for the diagnosis of field problems. Collection and preservation of plant diseased specimens for herbarium.

Note: Students should submit 50 pressed and well-mounted specimens.

Project:

Optional.

Course Outcomes:

- F. Student will be familiarized with the diseases of *Wheat, Sugarcane, Sunflower*.
- G. Student will come to know about diseases of *Mustard, Gram*.
- H. Student will come to know about the Diseases of horticultural Crops like *Mango, Citrus, Grape vine, Apple*.
- I. Student will know the diseases of *Strawberry, Cucurbits, Onion*
- J. Student will come to know about diseases of *Chillies, Turmeric, Coriander, Marigold*.

Text Books:

1. Rangaswamy, G and Mahadevan, A . 2012. *Diseases of crop plants in India*. Prentice hall of India Pvt Ltd, New Delhi.
2. Singh R S .2007. *8thed. Plant Diseases*. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi
3. Gupta ,V. K. 2014. *Diseases of Fruit Crops*. Kalyani Publishers
4. Chaube H.S. *Crop Diseases and Their Management*. PHI
5. Singh , R.P. 2013. *Plant Pathology*. Kalyani Publishers
6. Tripathi, D.P. 2009. *Crop Diseases*, Kalyani Publishers.
8. Singh, R.S. 2006. *Diseases of fruit crops*. Oxford and IBH Publishing Co. Pvt. Ltd. NewDelhi.

Reference Books:

4. Pathak, V.N. 1980 *Diseases of fruit crops*. Oxford and IBH Publishing Co. Pvt. Ltd, . New Delhi.
5. Singh R S .2007. *Plant Diseases*.(9th Ed.) Oxford and IBH Publishing Co.Pvt .Ltd .ND
6. Rangaswamy, G and Mahadevan, A . 2012. *4th ed. Diseases of crop plants in India*. Prentice hall of India Pvt Ltd, New Delhi.
7. Mishra A , Bohra A and Mishra , A. 2005. *Plant Pathology*. Agrobios. Jodhpur (India)
8. Singh, R.S.1994 *Diseases of vegetable crops*. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi

Web Source:

1. <https://agriinfo.in/plant-pathology/62/>
2. <http://ecoursesonline.iasri.res.in/Courses/Disease%20of%20Horticultural%20Crops%20&%20their%20Management/PATH371/Start%20to%20read%20the%20Course.html>
3. <http://ecoursesonline.iasri.res.in/Courses/Diseases%20of%20Field%20Crops%20and%20Their%20Management/PATH%20272/Start%20to%20read%20the%20Course.html>

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/course.php>



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
VI Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO51	Farm Management, Production & Resource Economics	1	-	2	3	2

Course Objectives:

11. To understand Principles of farm management.
12. To gain knowledge about concept of cost, Farm business analysis.
13. To gain knowledge of *Farm records*.
14. To understand risk and uncertainty occurs in agriculture production.
15. To gain knowledge about Concepts of resource economics.

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Introduction of farm management

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms. Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and product product relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage.

Unit-2:- Meaning and concept of cost

Meaning and concept of cost, types of costs and their interrelationship, importance of cost in managing farm business and estimation of gross farm income, net farm income, family labour income and farm business income. Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises.

Unit-3:- Farm records

Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts. Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming, appraisal of farm resources, selection of crops and livestock's enterprises.

Unit-4:- Risk and uncertainty

Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies, Crop/livestock/machinery insurance – weather based crop insurance, features, determinants of compensation.

Unit-5:- Concepts of resource economics

Concepts of resource economics, differences between NRE and agricultural economics, unique properties of natural resources. Positive and negative externalities in agriculture, Inefficiency and welfare loss, lotions, Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.

Case Studies:

Optional

List of Practicals:

12. Preparation of farm layout. Determination of cost of fencing of a farm.
13. Computation of depreciation cost of farm assets.
14. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources. Determination of most profitable level of inputs use in a farm production process.
15. Determination of least cost combination of inputs.
16. Selection of most profitable enterprise combination.
17. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises.
18. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts.
19. Collection and analysis of data on various resources in India.

Project:

Optional.

Course Outcomes:

- K. Student will be familiarized with the importance of farm management.
- L. Student will come to know about concept of cost, Farm business analysis.
- M. Student will come to know about the *Farm records*.
- N. Student will know the risk and uncertainty occurs in agriculture production.
- O. Student will come to know about Concepts of resource economics.

Text Books:

1. Dhondyal, S.P., "Farm Management – An Economic Analysis", Aman Publishing House, v Madhu Market, Meerut (U.P.).
2. Kerr, John M., et al., 1997, *Natural Resource Economics: Theory and Applications in India*, Oxford & IBH, New Delhi.
3. Raju, V. T. and D. V. S. Rao, 2002, "Economics of Farm Production and Management", Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
4. Singh, I. J., 1977, *Elements of Farm Management Economics*, Affiliated East-West Press Pvt. Ltd., New Delhi

Reference Books:

9. Sankhayan, P. L., 1988, *Introduction to the Economics and Agricultural Production*, Prentice Hall of India Private Limited, New Delhi.
10. Johl, S.S. and T.R. Kapur, 1989, *Fundamentals of Farm Business Management*, Kalyani Publishers, Ludhiana
11. Bhavani Devi, P. Raghu Ram, S. Subba Reddy, T.V. Neelakanta Sastry, 2009, *Agricultural economics*, Oxford and IBH Co. Pvt. Ltd., , New Delhi.

Web Source:

1. <https://agriinfo.in/extension/55/>
2. https://www.directhit.com/web?qo=semQuery&ad=semA&q=farm%20management%20pdf&o=777014&ag=fw4&an=msn_s&rch=intl225&rtb=29655

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/course.php>



Syllabus
VI Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO47	Management of Beneficial Insects	1	-	2	3	2

Course Objectives:

1. To understand **Introduction of beneficial Insects**
2. To gain complete knowledge about **Mulberry cultivation**
3. To gain knowledge of **Pest and diseases of silkworm**
4. To understand **Lac production**
5. To gain knowledge use of predators and parasitoids used in pest control

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Introduction of beneficial Insects

Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication.

Unit-2:- Mulberry cultivation

Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves.

Unit-3:- Pest and diseases of silkworm

Rearing, moulting and harvesting of cocoons. Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection.

Unit-4:- Lac production

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

Unit-5:- Pest control

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

Case Studies:

Optional

List of Practicals:

1. Honey bee species, castes of bees.
2. Beekeeping appliances and seasonal management, bee
3. enemies and disease.
4. Bee pasturage, bee foraging and communication.
5. Types of silkworm, voltinism and biology of silkworm.
6. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves.

7. Species of lac insect, host plant identification.
8. Identification of other important pollinators, weed killers and scavengers.
9. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies.
10. Identification and techniques for mass multiplication of natural enemies.

Project:

Optional.

Course Outcomes:

- P. Student will be familiarized with the importance of beneficial Insects
- Q. Student will come to know about **Mulberry cultivation**
- R. Student will come to know about the **Pest and diseases of silkworm**
- S. Student will know the **Lac production**
- T. Student will come to know about use of predators and parasitoids used in pest control

Text Books:

1. Dhaliwal GS & Arora R. 2001. *Integrated Pest Management: Concepts and approaches*. Kalyani Publ., New Delhi.
3. Gautam, R.D. *Biological Pest Suppression*, Westvill Publising Co., New Delhi.
4. Srivastava, K.P. 2004. *A Text Book of Entomology, Vol. I*, Kalyani Publishers, New Delhi.

Reference Books:

12. Abrol, D.P. 2013. *Beekeeping: A Comprehensive Guide to Bee and Beekeeping*, Scientific Publishers, Jodhpur.
13. Dhaliwal, GS & Koul O. 2007. *Biopesticides and Pest Management*. Kalyani Publ., New Delhi.

Web Source:

1. <https://www.amrita.edu/course/management-beneficial-insects>
2. <https://agriinfo.in/entomology/44/>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://nptel.ac.in/course.php>



मेडी-केप्स विश्वविद्यालय, इंदौर

Medi-Caps University, Indore

Syllabus
VI Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO46	Post-harvest Management and Value Addition of Fruits and Vegetables	1	-	2	3	2

Course Objectives:

6. To understand Importance of post-harvest processing of fruits and vegetables
7. To gain complete knowledge about Pre-harvest factors affecting postharvest quality, maturity, ripening and changes
8. To gain technical knowledge of **Principles and methods of preservation.**
9. To understand **Fermented and non-fermented beverages.**
10. To gain knowledge about Drying/ Dehydration of fruits and vegetables

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Introduction of post-harvest Management

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

Unit-2:- Factors affecting postharvest

Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening Respiration and factors affecting respiration rate

Unit-3:- Principles and methods of preservation.

Harvesting and Field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation.

Unit-4:- Fermented and non-fermented beverages.

Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages.

Unit-5:- Dehydration of fruits and vegetables

Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. Canning -- Concepts and Standards, packaging of products.

Case Studies:

Optional

List of Practicals:

11. Applications of different types of packaging,
12. containers for shelf life extension.
13. Effect of temperature on shelf life and quality of produce.
14. Demonstration of chilling and freezing injury in vegetables and fruits.
15. Extraction and preservation of pulps and juices.
16. Preparation of jam, jelly, RTS, nectar, squash, smotically dried products, fruit bar and candy and tomato products, canned products.
17. Quality evaluation of products -- physico-chemical and sensory.
18. Visit to processing unit/ industry.

Project:

Optional.

Course Outcomes:

- U. Student will be familiarized with the importance of **Post-harvest Management**.
- V. Student will come to know about Pre-harvest factors affecting postharvest quality, maturity, ripening and changes.
- W. Student will come to know about the **Principles and methods of preservation**.
- X. Student will know the **Fermented and non-fermented beverages**.
- Y. Student will come to know about Drying/ Dehydration of fruits and vegetables

Text Books:

1. *Jacob John, P A Handbook on Post Harvest management of Fruits and vegetables (2008) Daya Publishing House, Delhi*
2. *Manoranjan, K and Sangita, S. Food Preservation & Processing (1996) Kalyani Publishers*
3. *Mitra, S. K. Post Harvest Physiology and Storage of Tropical and Sub-tropical Fruits (1997) CAB International*
4. *Srivastava, R. P. & Sanjeev Kumar Fruits and vegetable Preservation – Principles an Practice (2002) International Book Distributing Co., Lucknow*
5. *Vijay, K. Text Book of Food Sciences and Technology (2001) ICAR*
6. *Mayani, Desai, Vagadia Post Harvest management of Horticultural crops Jaya Publishing House.*

Reference Books:

14. *Saraswathy, S. et. al. Post harvest Management of Horticultural Crops (2008) Agribios*
15. *Rosa L.A. Fruit and Vegetable Phytochemicals: Chemistry, Nutritional Value and Stability BioGreen*
16. *Verma, L. R. and Joshi, V. K. Post Harvest Technology of Fruits and Vegetables Vol. I & II. (2000) Indus Publishing Co., New Delhi*
17. *Morris, T. N. Principles of Fruit Preservation (2006) Biotech Books, Delhi*
18. *Battacharjee, S. K. and De, L. C Post Harvest Technology of Flowers and Ornamentals Plants (2005) Pointer Publisher*

Web Source:

1. <https://agriinfo.in/horticulture/65/>
2. <http://ecoursesonline.iasri.res.in/Courses/Post%20Harvest%20Mgmt.%20&%20Value%20Addition%20of%20Fruits&veg/Start%20to%20read%20the%20Course.html>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



Syllabus
VI Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO49	Practical Crop Production -II (<i>Rabi crops</i>)	0	-	4	4	2

Course Objectives:

11. To understand Field preparation, seed, treatment, nursery raising, sowing, nutrient, weed management
12. To gain complete knowledge about harvesting, threshing, drying winnowing, storage and marketing of produce.
13. To gain technical knowledge of seed production, mechanization, resource conservation and integrated nutrient management
14. To understand Insect-pest and disease management technologies.
15. To gain knowledge about Preparation of balance sheet including cost of cultivation, net returns

Prerequisites : 12th pass

Co-requisites : Nil

Case Studies:

Optional

List of Practicals:

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

Project:

Optional.

Course Outcomes:

- Z. Student will be familiarized with the Field preparation, seed, treatment, nursery raising, sowing, nutrient, weed management
- AA. Student will come to know about harvesting, threshing, drying winnowing, storage and marketing of produce.

- BB. Student will come to know about the seed production, mechanization, resource conservation and integrated nutrient management
- CC. Student will know the Insect-pest and disease management technologies.
- DD. Student will come to know about Preparation of balance sheet including cost of cultivation, net returns

Text Books:

1. Balasubramaniyan, P. and Palaniappan, S.P.2016. Principles and Practices of Agronomy (2nd edition), Agrobios (India), Jodhpur.

2. Reddy, S. R. 2016. Principles of Agronomy, Kalyani Publishers, Ludhiana.

3. Singh, S.S. and Singh, Rajesh. 2015. Principles and Practices of Agronomy (5th Re-set), Kalyani Publishers, New Delhi, Kalyani Publishers, Ludhiana.

Reference Books:

19. Balasubramaniyan, P. and Palaniappan, S.P.2016. Principles and Practices of Agronomy (2nd edition), Agrobios (India), Jodhpur.

20. Yawalkar, K.S., Agarwal, J.P. and Bokde, S. 2008. Manures and Fertilizers (10th edition), Agri-Horticultural Publishing House, Nagpur.

Web Source:

1. <http://www.eagri.org/eagri50/AGRO202/AGRO202.pdf>

2. http://agritech.tnau.ac.in/agriculture/agri_index.html

Open Learning Source:

1. <https://nptel.ac.in/course.php>

2. <https://www.agmoocs.in/courses>



Syllabus
VI Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO52	Principles of Food Science and Nutrition	2	-	0	2	2

Course Objectives:

16. To understand of food science
17. To gain complete knowledge about Food composition and chemistry
18. To gain technical knowledge of Food microbiology
19. To understand water *Principles of food processing and preservation*
20. To gain knowledge about *Energy metabolism*

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Introduction of food science

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

Unit-2:- Food composition

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

Unit-3:- Food microbiology

Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production of fermented foods);

Unit-4:- Principles of food processing and preservation

Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.); Food and nutrition, Malnutrition (over and under nutrition), nutritional disorders;

Unit-5:- Energy metabolism

Energy metabolism (carbohydrate, fat, proteins); Balanced/ modified diets, Menu planning, New trends in food science and nutrition.

Case Studies:

Optional

List of Practicals: NA

Project:

Optional.

Course Outcomes:

EE. Student will be familiarized with the importance of food science.

FF. Student will come to know about Food composition.

GG. Student will come to know about the **Food microbiology**.

HH. Student will know the *Principles of food processing and preservation*.

II. Student will come to know about **Energy metabolism**.

Text Books:

1. Srilakshmi, B. (2010). *Text Book of Food Science*. New age international (P) limited, publisher, New Delhi

2. Sehgal, S. and Raghuvanshi, R.S. (2007). *Text Book of Community Nutrition*, ICAR Publication

3. Khaddar V., (1999). *Text Book of Food. Storage and Preservation*. Kalyani Publishers, New Delhi.

Reference Books:

21. Srilakshmi, B. (2010). *Text Book of Nutrition Science*. New age international (P) limited, publisher, New Delhi

22. Swaminathan. M. (1993). *Advanced Textbook on Food and Nutrition. Volume I*, Bappco, the Bangalore Press and Publishing Co. Ltd. Bangalore, p. 576

Web Source:

1. <https://www.g-w.com/principles-of-food-science>
2. <http://vikaspedia.in/agriculture>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>



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Syllabus
VI Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO50	Principles of Organic Farming	1	-	2	3	2

Course Objectives:

21. To understand **organic farming**
22. To gain knowledge about **Organic ecosystem**
23. To gain technical knowledge of **Crops and varieties in organic farming.**
24. To understand **Certification organic farming.**
25. To gain knowledge about **Marketing of organic products.**

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction of organic farming

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

Unit-2:- Organic ecosystem

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

Unit- 3:- Crops and varieties in organic farming

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

Unit-4:- Certification organic farming

Operational structure of NPOP; Certification process and standards of organic farming.

Unit-5: Marketing of organic products

Processing, levelling, economic considerations and viability, marketing and export potential of organic products.

Case Studies:

Optional

List of Practicals:

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

Project:

Optional.

Course Outcomes:

- JJ. Student will be familiarized with the importance of **organic farming**
- KK. Student will come to know about Organic nutrient resources and its fortification.
- LL. Student will come to know about the use **Crops and varieties in organic farming.**
- MM. Student will know the Certification organic farming.
- NN. Student will come to know about **Marketing of organic products.**

Text Books:

1. Dhama, A.K. 2014. *Organic Farming for Sustainable Agriculture, Agrobios (India), Jodhpur.*
2. Palaniappan, S.P. and Anandurai, K.1999. *Organic Farming – Theory and Practice. Scientific Pub. Jodhpur*

Reference Books:

23. Thapa, U and Tripathy, P. 2006. *Organic Farming in India, Problems and prospects, Agritech, Publising Academy, Udaipur*
24. Sharma, Arun K. 2013. *A Handbook of Organic Farming, Agrobios (India), Jodhpur*

Web Source:

1. <http://vikaspedia.in/agriculture/crop-production/organic-farming>
2. http://agritech.tnau.ac.in/org_farm/orgfarm_farming_practices.html

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/course.php>



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Medi-Caps University, Indore

Syllabus
VI Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO44	Protected Cultivation and Secondary Agriculture	1	-	2	3	2

Course Objectives:

26. To understand *Green house technology*
27. To gain complete knowledge about *Cooling and heating system of Greenhouse*
28. To gain technical knowledge of **Irrigation systems used in greenhouses**
29. To understand **Cost estimation and economic analysis**
30. To gain knowledge about Drying and dehydration

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Introduction of Green house technology

Green house technology: Introduction, Types of Green Houses; Plant response to Greenhouse environment, Planning and design of greenhouses,

Unit-2:- Cooling and heating system of Greenhouse

Design criteria of green house for cooling and heating purposes. Green house equipment's, materials of construction for traditional and low cost green houses.

Unit-3:- Irrigation systems used in greenhouses

Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air greenhouse heating systems, green house drying.

Unit-4:- Cost estimation and economic analysis

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

Unit-5:- Drying and dehydration

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

Case Studies:

Optional

List of Practicals:

31. Study of different type of green houses based on shape.
32. Determine the rate of air exchange in an active summer winter cooling system.
33. Determination of drying rate of agricultural products inside green house.
34. Study of greenhouse equipment.
35. Visit to various Post Harvest Laboratories.
36. Determination of Moisture content of various grains by oven drying & infrared moisture methods.
37. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials).
38. Determination of Moisture content of various grains by moisture meter.
39. Field visit to seed processing plant.

Project:

Optional.

Course Outcomes:

- OO. Student will be familiarized with the *Green house technology*.
- PP. Student will come to know about Cooling and heating system of Greenhouse.
- QQ. Student will come to know about the Irrigation systems used in greenhouses
- RR. Student will know the Cost estimation and economic analysis
- SS. Student will come to know about Drying and dehydration

Text Books:

1. *Green house: Science and Technology*. 2016. Kothari S, S.C.Kaushic and A.N.Mathur. Himanshu Publication, Udaipur.
2. *Green House Technology- Application and Practice*. Sharma A and V.M.Salokhe. 2006. Agro Tech. publication, Udaipur
3. *Agricultural Process Engineering*. 1955. Henderson, S.M. and R.L. Perry. John Willy and Sons, New York.
4. *Unit operation of Agriculture Processing*. 2004. Shay K.M. and Singh, K.K. Vikas Publication House, New Delhi.

Reference Books:

25. *Post Harvest Technology of Cereals, Pulses and Oil Seeds*.1999. Chakravarty, A. Oxford and IBH Pub. New Delhi.
26. *Principles of Agricultural Engineering, Vol. I*. 2012. Michael, A.M. and T. P. Ojha . Jain Brothers, New Delhi.

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Protected%20Cultivation%20&%20Post%20Harvest%20Technology/AENG252/Start%20to%20read%20the%20Course.html>
2. http://agritech.tnau.ac.in/horticulture/horti_index.html

Open Learning Source:

1. <https://www.agmoocs.in/courses>
2. <https://nptel.ac.in/course.php>



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Syllabus
VI Semester

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3CO43	Rainfed Agriculture & Watershed Management	1	-	2	3	2

Course Objectives:

31. To understand Problems of rainfed agriculture in India.
32. To gain complete knowledge about Soil and water conservation techniques
33. To gain technical knowledge of Crop adaptation and mitigation
34. To understand *Contingent crop planning*
35. To gain knowledge about *Principles of watershed management.*

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:- Introduction of rainfed agriculture

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

Unit-2:- Soil and water conservation techniques

Soil and climatic conditions prevalent in rained areas; Soil and water conservation techniques, Drought: types, effect of water deficit on physio-morphological characteristics of the plants.

Unit-3:- Crop adaptation and mitigation

Crop adaptation and mitigation to drought; Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices.

Unit-4:- Contingent crop planning

Management of crops in rainfed areas, Contingent crop planning for aberrant weather conditions, Concept, objective.

Unit-5:- Principles watershed management

Principles and components of watershed management, factors affecting watershed management.

Case Studies:

Optional

List of Practicals:

40. Studies on climate classification,

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

Project:

Optional.

Course Outcomes:

- TT. Student will be familiarized with the Problems of rainfed agriculture in India.
 UU. Student will come to know about Soil and water conservation techniques.
 VV. Student will come to know about the Crop adaptation and mitigation
 WW. Student will know the *Contingent crop planning*
 XX. Student will come to know about *Principles of watershed management*.

Text Books:

1. Reddy, S.R. and Reddy, G. Prabhakara. 2015. *Dryland Agriculture*, Kalyani Publishers, Ludhiana.
2. Murthy, J. V. S. 1994. *Watershed Management*, Wiley Eastern Limited. New Age International Limited, New Delhi.
3. Singh, R.P., Sharma, S., Padmnabhan, N.V. , Das, S.K. and Mishra, P.K. 1990. *A Field Manual on Watershed Management*, ICAR (CRIDA), Hyderabad
4. Singh, P.K. 2000. *Watershed Management (Design & Practices)*, e-media Publication, Udaipur, India.
5. Singh, S.S., 1993, *Crop Management Under Irrigated and Rainfed Conditions*, Kalyani Publishers, New Delhi

Reference Books:

27. Dhruva Narayan, V.V. Singh, P.P., Bhardwaj, S.P., U. Sharma, Sikha, A.K., Vital, K.P.R. and Das, S.K. 1987. *Watershed Management for Drought Mitigation*, ICAR, New Delhi.
28. Jayanthi, C. and Kalpana, R. 2016. *Dryland Agriculture*, Kalyani Publishers, Ludhiana.
29. Singh, R.P. 1995, *Sustainable Development of Dryland Agriculture in India*. Scientific Publishers, Jodhpur.

Web Source:

1. <https://agriinfo.in/agronomy/39/>
2. <http://agritech.tnau.ac.in/>
3. <http://vikaspedia.in/agriculture>

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/>



Syllabus
Elective course

Course Code	Course Name	Hours per Week			Total	
		L	T	P	Hrs.	Credits
AG3EL09	Hi-tech. Horticulture	2	-	2	4	3

Course Objectives:

16. To understand Hi-tech. Horticulture
17. To gain complete knowledge about Protected cultivation, *Micro irrigation systems*
18. To gain technical knowledge of Fertilizer scheduling,
19. To understand use Remote sensing technology in agriculture.
20. To gain knowledge about Precision farming in horticultural crops.

Prerequisites : 12th pass

Co-requisites : Nil

Curriculum:

Unit-1:-Introduction Hi-tech. Horticulture

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

Unit- 2:-Protected cultivation

Protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation systems and its components;

Unit-3:- Fertilizer scheduling,

EC, pH based fertilizer scheduling, canopy management, high density orcharding, Components of precision farming:

Unit-4:-Remote sensing technology

Remote sensing, Geographical Information System (GIS), Differential Geo-positioning System (DGPS), Variable Rate applicator (VRA),

Unit-5:-Precision farming in horticultural crops

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

Case Studies:

Optional

List of Practicals:

20. Types of polyhouses and shade net houses,
21. Intercultural operations,
22. tools and equipments identification and application,
23. Micro propagation,
24. Nursery-protrays, micro-irrigation, EC, pH based fertilizer scheduling,
25. Canopy management,
26. visit to hi-tech orchard/nursery

Project:

Optional.

Course Outcomes:

YY. Student will be familiarized with the importance of Hi-tech. Horticulture.

ZZ. Student will come to know about *Protected cultivation*, *Micro irrigation systems*

AAA. Student will come to know about the *Fertilizer scheduling*.

BBB. Student will know the **Remote sensing technology in agriculture**.

CCC. Student will come to know about **Precision farming in horticultural crops**.

Text Books:

1. Hartman, HT and Kester, DE (1986). *Plant propagation principles and practices*. Prentice Hall of India Pvt. Ltd., Bombay

1. Gill, SS. Bal, JS and Sadhu, AS (1985). *Raising Fruit Nursery*, Kalyani Publishers, New Delhi.

3. Chadda K.L *Advanced in Horticulture* (2009) Malhotra Publishing House, New Delhi

5. Chandra, S & Som, V. 2000. *Cultivating Vegetables in Green House*. *Indian Horticulture* 45:17- 18.

7. Tiwari GN. 2003. *Green House Technology for Controlled Environment*. Narosa Publ. House.

Reference Books:

30. Chadha, K.L. *Handbook of Horticulture* (2002) ICAR, New Delhi

31. Prasad S & Kumar U. 2005. *Greenhouse Management for Horticultural Crops*. Agrobios.

Web Source:

1. <http://ecoursesonline.iasri.res.in/Courses/Protected%20Cultivation%20&%20Post%20Harvest%20Technology/AENG252/Start%20to%20read%20the%20Course.html>
2. http://agritech.tnau.ac.in/horticulture/horti_index.html

Open Learning Source:

1. <https://nptel.ac.in/course.php>
2. <https://www.agmoocs.in/courses>

Medi-Caps University, Indore
Faculty of Agriculture
Model New Scheme as per Medi-Caps University

Fourth Year (Odd Semester - VII Sem) - Rural Agricultural Work Experience (RAWE) and Agro-Industrial Attachment (AIA)							
Sr. No.	Subject Code	Courses	L	T	P	Credit	Remark
1	AG3PC01	Survey of Village	0	0	1	1	Component I
2	AG3PC02	Agronomical Interventions	0	0	3	3	
3	AG3PC03	Fruit & Vegetable Production Interventions	0	0	3	3	
4	AG3PC04	Animal Production Interventions	0	0	1	1	
5	AG3PC05	Soil Improvement Interventions Soil Sampling and Testing	0	0	2	2	
6	AG3PC06	Extension and Transfer of Technology Activities	0	0	3	3	
7	AG3PC07	Plant Protection Interventions	0	0	2	2	
8	AG3PC08	Agro-Industrial Attachment (AIA) including Food Processing and Storage Interventions	0	0	5	5	Component II
		Total	0	0	20	20	

Medi-Caps University, Indore
Faculty of Agriculture
Model New Scheme as per Medi-Caps University
Fourth Year (Even Semester - VIII Sem) - Experiential Learning Programme (ELP)/ Hands On
Training (HOT)

Sr. N.	Subject Code	Courses	L	T	P	Credit
1	AG3AE01	Production Technology for Bioagents and Biofertilizer	0	0	10	10
2	AG3AE02	Seed Production and Technology	0	0	10	10
3	AG3AE03	Mushroom Cultivation Technology	0	0	10	10
4	AG3AE08	Floriculture and Landscaping	0	0	10	10
5	AG3AE09	Food Processing	0	0	10	10
6	AG3AE11	Organic Production Technology	0	0	10	10
7	AG3MC05 (Q)	Educational Tour	0	0	2	2
		Total	0	0	20	22
		Grand Total				185