ANDHRA KESARI UNIVERSITY ::ONGOLE

CURRICULAR FRAMEWORK **B.VOC. (Agriculture)**

FROM THE A.Y. 2025-26 batch (Major + Minor with CSP & VI Semester Internship)

1st Year - Semester I								
Sl. No	**Category**	**Course No**	**No. of Hours**		**Total No. of Hours**	**No. of Credits**		**Total No. of Credits**
			Theory	**Practical**		**Theory**	**Practical**	
1	**Major – Core (Basics in crop production and crop protection)**	I	3	2	5	3	1	4
2	Major – Core **(Basics of Agricultural Sciences)**	II	3	2	5	3	1	4
3	AECC - English	I	4	0	4	3	0	3
4	AECC - MIL (Telugu/Hindi/Sanskrit)	I	4	0	4	3	0	3
5	**Skill Enhancement Course (SEC) Intro' to Artificial Intelligence**	I	4	2 (Practice)	6	4	0	4
End of Semester I of 1st Year		**5**	**18**	**6**	**24**	**16**	**2**	**18**
1st Year - Semester II								
Sl. No	**Category**	**Course No**	**No. of Hours**		**Total No. of Hours**	**No. of Credits**		**Total No. of Credits**
			Theory	**Practical**		**Theory**	**Practical**	
1	Major – Core (Principals of Agronomy)	III	3	2	5	3	1	4
2	Major – Core (Introduction to Soil Science)	IV	3	2	5	3	1	4
5	English	II	4	0	4	3	0	3
6	MIL (Telugu/Hindi/Sanskrit)	II	4	0	4	3	0	3
7	**Multidisciplinary Course (Introduction to Social work)**	I	2	0	2	2	0	2
8	Skill Enhancement Course (SEC) Application of Artificial Intelligence (Discipline Specific)	II	4	2 (Practice)	6	4	0	4
9	**Indian Knowledge System**	I	2	0	2	0	0	0
10	**Community Service Project (minimum of 80 hours with 1 Credit)**							1
End of Semester II of 1st Year		**7**	**22**	**6**	**28**	**18**	**3**	**21**

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2nd Year - Semester III								
Sl. No	**Category**	**Course No**	**No. of Hours**		**Total No. of Hours**	**No. of Credits**		**Total No. of Credi ts**
			Theory	**Practical**		**Theory**	**Practical**	
1	Major – Core (Agronomy of field crops)	VI	3	2	5	3	1	4
2	**Major – Core (Manures, fertilizers and soil fertility management)**	VII	3	2	5	3	1	4
3	Major – Core (**Introduction to Entomology**)	VIII	3	2	5	3	1	4
4	Minor (Fundamentals of Genetics)	I	3	2	5	3	1	4
5	AECC (Creative Writing/Business Writing in English)	III	4	0	4	3	0	3
6	AECC (Creative Writing/Journalistic Writing in MIL - Telugu/Hindi/Sanskrit)	III	4	0	4	3	0	3
7	**Multidisciplinary Course (Introduction to Public Administration)**	II	2	0	2	2	0	2
8	**Skill Enhancement Course (SEC) Design Thinking/Problem Solving / Others**	III	2	0	2	2	0	2
End of Semester III of 2nd Year		**8**	**24**	**8**	**32**	**22**	**4**	**26**

2nd Year - Semester IV								
Sl. No	**Category**	**Course No**	**No. of Hours**		**Total No. of Hours**	**No. of Credits**		**Total No. of Credi ts**
			Theory	**Practical**		**Theory**	**Practical**	
1	**Major – Core (Introduction to Pathology)**	IX	3	2	5	3	1	4
2	Major – Core **(Pests of Field crops and their Management)**	X	3	2	5	3	1	4
3	Major – Core	XI	3	2	5	3	1	4

	(Diseases of field crops and their management)							
4	Minor (Horticulture)	II	3	2	5	3	1	4
5	Multidisciplinary Course (Introduction to Nanotechnology)	IV	2	0	2	2	0	2
6	Skill Enhancement Course (SEC) Design Thinking/Problem Solving / Others	IV	2	0	2	2	0	2
End of Semester IV of 2nd Year		**6**	**16**	**8**	**24**	**16**	**4**	**20**

3rd Year - Semester V								
Sl.No	**Category**	**Course No**	**No. of Hours**		**Total No. of Hours**	**No. of Credits**		**Total No. of Credits**
			Theory	**Practical**		**Theory**	**Practical**	
1	Major - Core(Principles of Plant Breeding)	V	3	2	5	3	1	4
2	Major – Elective (**Fundamentals of Genetics**)	XII	3	2	5	3	1	4
3	Major – Elective (Fundamentals of Crop Physilogy)	XIII	3	2	5	3	1	4
4	Minor (Principles of Organic farming)	III	3	2	5	3	1	4
5	Minor (**Production technolgy Of fruits and Vegetables**)	IV	3	2	5	3	1	4
6	**Environmental Education**	I	2	0	2	2	0	2
End of Semester V of 3rd Year		**6**	**17**	**10**	**27**	**17**	**5**	**22**
3rd Year - Semester VI								
Sl.No	**Category**	**Course No**	**No. of Hours**		**Total No. of Hours**	**No. of Credits**		**Total No. of Credits**
			Theory	Practical		Theory	Practical	
1	Major – Elective (weed and Water mangement)	XIV	3	2	5	3	1	4
2	Major – Elective (**Pests of Horticultural**	XV	3	2	5	3	1	4

	crops and Productive entomology)							
3	**Minor (Principles of Seed Technology)**	VII	3	2	5	3	1	4
4	**Minor (Introduction to Production economics and Farm management)**	VIII	3	2	5	3	1	4
5	**Semester Internship (minimum of 180 hours with 3 Credits)**							3
End of Semester VI of 3rd Year		**4**	**12**	**8**	**20**	**12**	**7**	**19**

4th - Year - Semester VII								
Sl.No	**Category**	**Course No**	**No. of Hours**		**Total No. of Hours**	**No. of Credits**		**Total No. of Credits**
			Theory	**Practical**		**Theory**	**Practical**	
1	Major – Core (Agriculture Microbiology)	XII	3	2	5	3	1	4
2	Major – Core (Insect ecology and *integrated pest management*)	XIII	3	2	5	3	1	4
3	Major – Core (Farm Power and Machinary)	XIV	3	2	5	3	1	4
4	Major – Elective (Rainfed Agriculture and watershed management)	V	3	2	5	3	1	4
5	Major – Elective (Principles of Seed technolgy)	VI	3	2	5	3	1	4
6	OOTC	I	2		2	2		2
7	IKS	I	2		2		Audit Course	
End of Semester VII of 4th Year		**7**	**19**	**10**	**29**	**17**	**5**	**22**
4th - Year - Semester VIII								

Sl.No	Category	Course No	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
			Theory	Practical		Theory	Practical	
1	Major – Core (Principles of Plant Biotechnology)	XII	3	2	5	3	1	4
2	Major – Core (Breeding of Field Crops)	XIII	3	2	5	3	1	4
3	Major – Core (Fundamentals of Rural Socilogy and extension education)	XIV	3	2	5	3	1	4
4	Major – Elective (Principles of Organic farming	V	3	2	5	3	1	4
5	Major – Elective (Production technology of fruits and vegetables)	VI	3	2	5	3	1	4
6	OOTC	I	2		2	2		2
7	IKS	I	2		2		Audit Course	
End of Semester VIII of 4th Year		**7**	**19**	**10**	**29**	**17**	**5**	**22**

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B. VOCATIONAL COURSE
AGRICULTURE (Honours)
2025-26 Admitted Batch
Batch 3 Year Semester- V

Coures 11: PRINCIPLES OF PLANT BREEDING

(CREDITS 3+1=4)

UNIT-I-

- Self – incompatibility and male sterility- genetic consequences, cultivar options; Domestication, Acclimatization, introduction, Centre of origin/diversity.

UNIT-II-

- Genetic basis and breeding methods in self-pollinated crops-mass and pure line selection, hybridization techniques and handling of segregating population.

UNIT-III-

- Multiline concept; Concepts of population genetics and Hardy Weinberg Law.
- Genetic basis and methods of breeding cross pollinated crops, modes of selection.

UNIT-IV-

- Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties
- Breeding methods in asexually propagated crops, clonal selection and hybridization.

UNIT-V

- Wide hybridization and pre-breeding; Polyploidy in relation to plant breeding; mutation breeding- methods and uses.

(PRACTICAL)

- Plant Breeder's kit; Study of germplasm of various crops;
- Study of floral structure of self-pollinated and cross pollinated crops;
- Emasculation and hybridization techniques in self & cross pollinated crops;
- Consequences of inbreeding on genetic structure of resulting populations;
- Study of male sterility system; Handing of segregation populations;
- Methods of calculating mean, range, variance, standard deviation.
- Designs used in plant breeding experiment, analysis of Randomized Block Design;
- Estimation of heterosis, inbreeding depression and heritability;
- Layout of field experiments;
- Work out the mode of pollination in a given crop and extent of natural out crossing;
- Prediction of performance of double cross hybrids.

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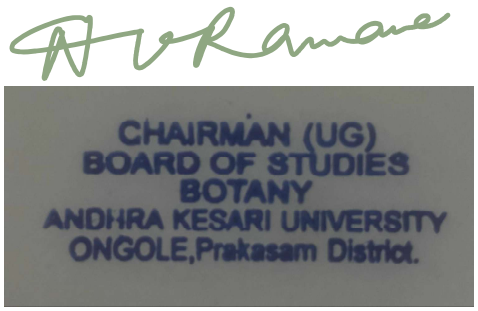
REFERENCES

1. Principles of Plant Breeding (1st & 2nd Edition) by RW Allard,
2. Breeding Field Crops by JM Poehlman,
3. Plant Breeding: Principles & Practices by JR Sharma,
4. Genetics by Strickberger, and
5. An introduction to genetic analysis by Suzuki et Al.



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AGRICULTURE (Honours)
2025-26 Admitted Batch
Batch 3 Year Semester- V

Coures 12: FUNDAMENTALS OF GENETICS

(CREDITS 3+1=4)

UNIT – I

- Gene expression and differential gene activation – Operon concept – Lac Operon
- Meiosis – definition – process – differences between mitosis and meiosis – significance in plant breeding
- linkage – definition – linkage groups – characteristic features of linkage – pleiotropy – linkage groups
- Crossing over – mechanism of crossing over – types of crossing over – factors effecting crossing over – cytological proof of crossing over in Drosophila – significance of crossing over in plant breeding – coincidence – interference

UNIT – II

- Mendel's Laws – Law of segregation – Law of independent assortment – Principle of dominance – Principle of unit characters – exceptions to Mendel's Laws
- Monohybrid and dihybrid ratios – modifications of F2 ratio in monohybrid and dihybrid crosses and lethal factors

UNIT - III

- Gene action – types of gene action – pleiotropism – alleles – characteristic features of alleles
- multiple alleles (blood groups in human beings) – characteristic features of multiple alleles –
- Penetrance (complete penetrance and incomplete penetrance) and expressivity (uniform expressivity and variable expressivity) – sex determination

UNIT – IV

- Gene mutations – introduction – definition – terminology – classification of mutations – characteristic features of mutations – spontaneous mutations and induced mutations
- Gene mutations – artificial induction of mutations – physical and chemical mutagens
- Chromosomal aberrations – structure – types of structural chromosomal aberrations – deletions (deficiencies) and duplications

UNIT - V

- Numerical chromosomal aberrations – terminology – classification – euploidy and aneuploidy – kinds of polyploids – autopolyploids, allopolyploids and segmental allopolyploids
- Numerical chromosomal aberrations – euploidy – monoploids – haploids – differences between monoploids and haploids – diploidy – polyploidy – origin of polyploidy – induction of polyploidy – triploids – tetraploids
- Numerical chromosomal aberrations – polyploidy
- Numerical chromosomal aberrations – aneuploidy – types of aneuploids – monosomics, double monosomics, nullisomics, double nullisomics, trisomics (primary, secondary and tertiary trisomics) and tetrasomics

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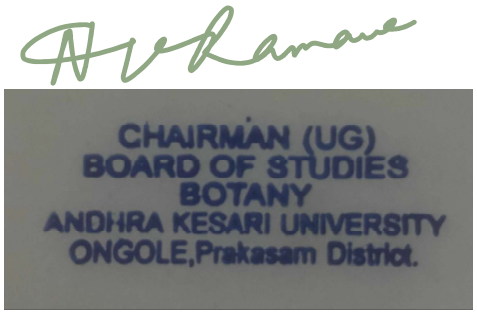
References

1. Gupta, P.K. 1985. Cytology, Genetics and Cytogenetics. Rastogi Publications, Meerut. Gupta, P.K. 2007. Genetics. Rastogi Publications, Meerut.
2. Pundhan Singh, 2000. Elements of Genetics. Kalyani Publishers, Ludhiana.
3. Singh, B.D. 2007. Fundamentals of Genetics. Kalyani Publishers, Ludhiana.
4. Strickberger, M.W. 2004. Genetics. Prentice – Hall of India Pvt. Ltd., New Delhi.
5. Verma, P.S. and Agarwal, V.K. 2005. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand and Co., New Delhi

FUNDAMENTALS OF GENETICS (PRACTICAL)

1. Study of microscope.
2. Study of cell structure.
3. Practice on mitotic cell division.
4. Practice on meiotic cell division.
5. Practice on meiotic cell division.
6. Probability and Chi-square test.
7. Monohybrid and its modifications.
8. Dihybrid.



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B. VOCATIONAL COURSE

AGRICULTURE (Honours)

2025-26 Admitted Batch

Batch 3 Year Semester- V

Coures 13: FUNDAMENTALS OF CROP PHYSIOLOGY

(CREDITS 3+1=4)

UNIT – I

Absorption of water – Diffusion and osmosis – water potential and its components – Importance of water potential – Active and passive uptake of water – Stomatal complex – Transpiration – Water use efficiency – Water use efficiency of C3, C4 and CAM plants – Water requirement / Transpiration ratio- Factors affecting WUE. Assimilation of mineral nutrients – Nitrate assimilation – Ammonium assimilation in plants – Biological nitrogen fixation – Free-living and symbiotic bacteria – Nodule formation – Nitrogenase enzyme complex.

UNIT – II

Photosynthesis – Reactions of photosynthesis – Energy synthesis – Principle of light absorption by plants – Light reactions – Cyclic and non-cyclic photophosphorylation – CO2 fixation – C3 and C4 pathways – Significance of C4 pathway – CAM pathway and its significance

UNIT – III

Photorespiration and its significance – Photosynthetic efficiency of C3, C4 and CAM plants – Factors affecting photosynthesis (light, CO2, temperature and water stress). Respiration – Energy balance – Significance of respiration – Oxidative Pentose Phosphate Pathway (OPPP) and its significance.

UNIT – IV

Physiology of flowering – Photoperiodism and flowering – Importance of photoperiodism – Classification of plants based on photoperiodic responses – Flowering hormones – Vernalization and flowering – importance of vernalization in AGRICULTURE (Honours). Plant growth regulators – Auxins – mode of action and physiological roles – Commercial uses – Gibberellins – mode of action and physiological roles – Commercial uses – Cytokinins – mode of action and physiological roles – commercial uses – ABA – mode of action and physiological roles Commercial uses – Ethylene – mode of action and physiological roles – Commercial uses.

UNIT – V

Post-harvest physiology – Dormancy – Types of dormancy – Advantages and disadvantages of dormancy – Fruit ripening – Climacteric and non-climacteric fruits – Metabolic changes during fruit ripening – Hormonal regulation of fruit ripening – Ripening induction and ripening inhibition – Seed viability and seed vigor – Tests of viability and vigor- Physiological maturity, harvestable maturity- Indices of physiological maturity in crops.

FUNDAMENTALS OF CROP PHYSIOLOGY (PRACTICAL)

Solutions- Preparation, Seed vigor and viability tests, optimum conditions for seed germination, leaf area measurement, Growth analysis, Measurement of water status in plants, Measurement of water potential, Measurement of Stomatal frequency and index photosynthetic pigments- Absorption spectrum, Leaf anatomy of C3 and C4 plants, Measurement of photosynthesis – Hill's reaction, Measurement of photosynthesis by IRGA, Effect of plant growth regulators on plant growth. Diagnosis of various nutrient deficiency symptoms in various Field and Horticultural crops, their Yield analysis.

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References

Taiz, L. and Zeiger, E. 2010. *Plant Physiology* 5th edition, Sinauer Associates, Sunderland, MA, USA.

Gardner, F.P., Pearce, R.B., and Mitchell, R.L. 1985. *Physiology of Crop Plants.* Scientific Publishers, Jodhpur.

Noggle, G.R. and Fritz, G.J., 1983. *Introductory Plant Physiology.* 2nd Edition. Prentice Hall Publishers, New Jersey, USA.

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