KAKATIYA UNIVERSITY

B.Sc. Final Year (Under CBCS)

SEMESTER – V

(SEC-3) Skill Enhancement Course-III

(FOR ALL SCIENCE FACULTY DEPARTMENTS)

VERBAL REASONING FOR APTITUDE TEST

Credits: 2

Theory: 2 hours/week **Marks - 50**

Unit – I NUMBERS AND DIAGRAMS

1.1 Series Completion: Number series, Alphabet Series

1.2 Series Completion: Alpha Numeric Series, Continuous Pattern Series

1.3 Logical Venn Diagrams

1.4 Mathematical Operations: Problem solving by substitution, Interchange of signs and numbers

Unit – II ARITHMETICAL REASONING

2.1 Mathematical Operations: Deriving the appropriate conclusions

2.2 Arithmetical Reasoning: Calculation based problems, Data based problems

2.3 **Arithmetical Reasoning**: Problems on ages, Venn diagram based problems

2.4 Cause and Effect Reasoning

Text Book: A Modern Approach to Verbal & Non-Verbal Reasoning by Dr. R.S.Aggarwal

KAKATIYA UNIVERSITY

B.Sc. Final Year (Under CBCS)

SEMESTER – V

(GE-1) GENERIC ELECTIVE-I

(FOR ALL SCIENCE FACULTY DEPARTMENTS)

PUBLIC HEALTH AND HYGIENE

Credits: 2

Theory :2 hours/week **Marks:50**

UNIT – I : NUTRITION AND ENVIRONMENT

1.1 Balanced diet and Malnutrition.

1.2 Nutritional deficiencies and disorders- Carbohydrates, proteins, lipids, vitamins and minerals.

1.3 Occupational, Industrial, agricultural and urban Health-Exposure at work place, urban areas, industrial workers, farmers and agricultural labourers, Health workers and health disorders and diseases.

1.4 Environmental pollution and associated Health hazards, Water borne diseases and Air borne diseases.

UNIT-II : DISEASES AND HEALTH CARE

2.1 Causes, Symptoms, Diagnosis, Treatment and Prevention - Malaria, Filaria, Measles, Polio, Chicken pox, Rabies, Plague, Leprosy,.

2.2 Causes, Symptoms, Diagnosis, Treatment and Prevention of non communicable diseases - Hypertension, Coronary Heart diseases, Stroke, Diabetes, Obesity and Mental ill-health.

2.3 Health care legislation in India – Termination of pregnancy act, Maternity benefit act, Biomedical waste act, ESI act.

2.4 First Aid and Health awareness, personal health care record maintenance.

KAKATIYA UNIVERSITY

U.G. Botany (Under CBCS)

B.Sc. Final Year (DSC-1E)

SEMESTER – V

Cell Biology and Genetics

DSC-1E (3 hrs./week)

Unit - I:

1. Plant cell envelops: Ultra structure of cell wall, molecular organization of cell membranes.(4h)
2. Nucleus: Ultra structure, Nucleic acids - Structure of DNA, types and functions of RNA. (4 h)
3. Chromosomes: Morphology, organization of DNA in a chromosome, Euchromatin and Heterochromatin, Karyotype. DNA Replication. Special types of chromosomes: Lampbrush Polytene and B - chromosomes. (7h)

Unit - II:

4. Extra nuclear genome: Mitochondrial and plastid DNA, plasmids. (3 h)
5. Cell division: Cell and its regulation; mitosis, meiosis and their significance (3h)
6. Mutations: Chromosomal aberrations - structural and numerical changes; Gene mutations, Transposable elements. (3 h)

Unit - III:

7. Mendelism: Laws of inheritance. Genetic interactions - Epistasis, Complementary, Supplementary and inhibitory genes. (5h)
8. Linkage: A brief account and theories of Linkage. Crossing over: Mechanism and theories of crossing over. (4 h)
9. Genetic maps: Construction of genetic maps with Two point and Three point test cross data. (3h)

Unit - IV:

10. Gene Organization- Structure of gene, Genetic code, Method of Replication of DNA in Eukaryotes & Prokaryotes (3h)
11. Mechanism of transcription in Prokaryotes and Eukaryotes, translation (4h)
12. Regulation of gene expression in prokaryotes (Lac and Trp. Operons). (2h)

References:

1. Sharma, A. K. and A. Sharma. 1999. Plant Chromosomes: Analysis, Manipulation and Engineering. Harward Academic Publishers, Australia.

2. Shukla, R. S. and P. S. Chandel. 2007. Cytogenetics, Evolution, Biostatistics and Plant Breeding. S.Chand & Company Ltd., New Delhi.

3. Singh, H. R. 2005. Environmental Biology. S. Chand & Company Ltd., New Delhi.

4. Snustad, D. P. and M. J. Simmons. 2000. Principles of Genetics. John Wiley & Sons, Inc., U S A.

5. Strickberger, M. W. 1990. Genetics (3rd Ed.). Macmillan Publishing Company.

6. Verma, P. S. and V. K. Agrawal. 2004. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand & Company Ltd., New Delhi.

KAKATIYA UNIVERSITY

U.G. Botany (Under CBCS)

B.Sc. Final Year (DSC-1E)

SEMESTER – V

Cell Biology and Genetics Practical

1. Demonstration of cytochemical methods: Fixation of plant material and nuclear staining for mitotic and meiotic studies. (6 h)
2. Study of various stages of mitosis using cytological preparation of Onion root tips. (6 h)
3. Study of various stages of meiosis using cytological preparation of Onion flower buds. (3 h)
5. Solving genetic problems related to monohybrid, dihybrid ratio incomplete dominance and interaction of genes (minimum of six problems in each topic). (12h)
6. Construction of linkage maps; two and three point test cross. (6 h)
7. Study of ultra structure of cell organelles using photographers. (6h)
8. Study of Special types of Chromosomes (6h)

KAKATIYA UNIVERSITY

U.G. Botany (Under CBCS)

B.Sc. Final Year (DSE-1E)

SEMESTER – V

Elective

A) Ecology & Biodiversity

DSE-1E (3 hrs./week) Theory Syllabus

Unit – I

1. Concept and components of Ecosystem. Energy flow, food chains, food webs, ecological pyramids, Biogeochemical cycles - Carbon Cycle (4h)
2. Definition of Environment: Atmosphere (Troposphere, Stratosphere , Mesosphere , Ionosphere), Hydrosphere, Lithosphere & Biosphere. (3h)
3. Plants and environment: Ecological factors - Climatic (Light and Temperature), and biotic. Ecological adaptations of plants. (5h)

Unit – II

4. Edaphic Factors: Soil- Formation- Weathering, mode of formation-residual; Transported: Colluvial, Alluvial, Glacial & Eolian. Soil erosion & Conservation. (4h)
5. Population ecology: Natality, Mortality, Growth curves, Ecotypes & Ecads. (4h)
6. Community ecology: Frequency, density cover, Life forms &Biological spectrum. (4h)

Unit – III

7. Community Dynamics: Succession - Serial stages, Modification of physical environment, Climax formation with reference to Hydrosere and Xerosere. (4h)
8. Production ecology: Concepts of productivity - Primary and Secondary Productivity. (4h)
9. Biodiversity: Concepts, Convention of Biodiversity - Earth Summit (Copenhagan). (4h)

Unit – IV

10. Biodiversity – Levels, threats and value (3h)
11. Hot spots of India - North Eastern Himalayas, Western Ghats; Endemism. (3h)
    IUCN categories, RED data book
12. Principles of conservation – *Insitu* and *Exsitu*. Role of organizations in the conservation of Biodiversity - WWF and NBPGR. (3h)

References:

1. Bharucha, E. 2005. Textbook of Environmental Studies for Undergraduate Courses. Universities Press (India) Private Limited, Hyderabad.
2. Khitoliya, R. K. 2007. Environmental Pollution – Management and Control for Sustainable Development. S. Chand & Company Ltd., New Delhi.
3. Michael, S. 1996. Ecology. Oxford University Press, London.
4. Mishra. D. D. 2008. Fundamental Concepts in Environmental Studies. S. Chand & Company Ltd.,New Delhi.
5. Odum, E. P. 1983. Basics of Ecology. Saunder's International Students Edition, Philadelphia.
6. Sharma, P. D. 1989. Elements of Ecology. Rastogi Publications, Meerut.
7. Verma, P. S. and V. K. Agrawal. 2006. Genetics. S. Chand & Company Ltd., New Delhi

KAKATIYA UNIVERSITY

U.G. Botany (Under CBCS)

B.Sc. Final Year (DSE-1E)

SEMESTER – V

Elective

A) Ecology & Biodiversity

Practical Syllabus

1. Study of plant communities by Quadrat Method (9h)
2. Estimation of carbonates and bicarbonates in the given water sample. (6h)
3. Determination of soil texture (composition of clay, sand silt etc.) and pH. (6h)
4. Study of morphological and anatomical characteristics of plant communities using locally available plant species: Hydrophytes (*Eichhornia, Hydrilla, Pistia, Nymphaea, Vallisneria*), Xerophytes: (*Asparagus,Opuntia, Euphorbia spp*), Halophytes (*Rhizophora, Avicennia*) . (12h)
5. Value of biodiversity
   a) Medicinal value: *Catharanthus, Tinospora* and *Emblica (*12h)
   b) Timber Value: *Acacia, Tectona* and *Azardirachta*
   c) Aesthetic Value: *Mangifera, Ficus, Ocimun*

KAKATIYA UNIVERSITY

U.G. Botany (Under CBCS)

B.Sc. Final Year (DSE-1E)

SEMESTER – V

Elective

B) Horticulture

DSE-1E (3 hrs./week) Theory Syllabus

Unit – I

1. Definition, branches, scope and economic importance of horticultural crops (4h)
2. Classification of horticultural crops based on -Climatic requirements, Season of growth (6h)
3. Manures: Definition, importance of manures FYM (compost), oil cakes, green manure (3h)

Unit – II

4. Organic manures and vermi-compost (2h)
5. Natural Propagation: By seeds, Vegetative Structures like Bulbs, Tubers, Corms, Rhizomes, Root stock, runners, Offsets and suckers (4h)
6. Artificial Propagation: Cutting, Layering, Grafting and Budding (4h)

Unit – III

7. Application of the following plant growth regulators in horticulture **–** Auxins**,** Gibberellins, Cytokinins, Ethylene and Brassinosteroids. (4h)
8. Green house technology- definition, types, layout, construction, irrigation systems, care and attention, hardening of plants. (3h)
9. Soil and climatic requirements of horticultural crops, Selection of site, planning, training (3h)

Unit – IV

10. Pruning and Cropping system; Garden implements and their uses (2h)
11. Management: Orchard management, Nutrition management, Water management and Weed Management. (4h)
12. Organic Farming; Bonsai techniques. (6h)

References:

1. Bhattacharjee.S.K. 2006. Amenity Horticulture, Biotechnology and Post harvest technology. Pointer publishers. Jaipur
2. Chadha, K.L. 2001, Handbook of Horticulture, ICAR, New Delhi.
3. Chandra, R. and M. Mishra. 2003. Micropropagation of horticultural crops. International Book Distributing Co., Lucknow.
4. Chattopadhyaya, P.K.2001. A text book on Pomology (Fundamentals of fruit growing) Kalyani Publication, New Delhi
5. Christopher, E.P. 2001. Introductory Horticulture, Biotech Books, New Delhi
6. Edmond, J.B. T.L.Senn, F.S. Andrews and P.G.Halfacre, 1975. Fundamentals of Horticulture, Tata MC. Graw Hill Publishing Co.New Delhi
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8. Hartman, H.T. and Kester, D.E. 1986. Plant propagation – Principles and Practices – Prentice Hall of India Ltd., New Delhi.
9. Jacob John. P. 2008. A hand book of post harvest management of fruits and vegetables. Daya publishers.
10. Jitendra Singh. 2006. Basic Horticulture. Kalyani Publishers, New Delhi.
11. Rajan, S. and B.L. Markose. 2007. Propagation of horticultural crops. New India Publishing, New Delhi.
12. Shanmugavelu, K.G., N. Kumar and K.V. Peter. 2005. Production technology of spices and plantation crops. Agrobios, Jodhpur.
13. Singh, D.K. 2008. Hi-tech horticulture. Agrotech publishers, Udaipur
14. Singh, N.P. 2005. Basic concepts of fruit science. International Book Distributing Co., Lucknow.
15. Surendra Prasad and U. Kumar. 1999. Principles of horticulture, Agro-botanica, Bikaner, India.
16. Sureshkumar, P. Sagar and Manish Kanwat. 2009. Post harvest physiology and quality management of fruits and vegetables. Agrotech publishers, Udaipur
17. Utpal Banerjee. 2008. Horticulture. Mangal Deep publishers
18. Vijaikumar UmRao. 2008. Horticulture terms – Definitions and Terminology. IBD publishers, Dehradun
19. Adams, C.R. and M. P. Early. 2004. Principles of horticulture. Butterworth –Heinemam, Oxford University Press.
20. Bansil. P.C. 2008. Horticulture in India. CBS Publishers and Distributors, New Delhi.
21. Kumar, N.1997. Introduction to Horticulture, Rajalakshmi Publication, Nagercoil.

KAKATIYA UNIVERSITY

U.G. Botany (Under CBCS)

B.Sc. Final Year (DSE-1E)

SEMESTER – V

Elective

B) **Horticulture**

Practical Syllabus

Garden tools and implements. (3h)

1. Identification and description of any two varieties/hybrids of tropical and subtropical vegetable, fruit, flower and ornamental crops. (3h)
2. Propagation practices by seed, Vegetative propagation (Rhizome, bulb, corm), cutting, layering, budding, grafting with two examples. (9h)
3. Seed propagation- seed treatments, sowing and seedling production. (6h)
4. Nursery practices, transplanting, field preparation, sowing/planting, use of herbicides, top dressing of fertilizers and use of growth regulators. (6h)
5. Nursery containers, media, potting and repotting of plants, hardening of plants in nursery, shade regulation in nursery, plant protection in nursery plants (Demonstration) (6h)
6. Packing nursery plants for local and long distance markets. (Demonstration) (3h)
7. Making of organic-compost. (9h)

KAKATIYA UNIVERSITY

U.G. Botany (Under CBCS)

B.Sc. Final Year (DSE-1E)

SEMESTER – V

Elective

C) Microbiology and Plant Pathology

DSE-1E (3 hrs./week) Theory Syllabus

Unit – I

1. Discovery of microorganisms; systematic position of microorganisms in biological world; classification of microorganisms (2h)
2. Sterilization methods; culture media; pure culture methods; growth determination (2h)
3. Prokaryotic microorganisms; fine structure of prokaryotic cell; bacteriophage T4; general account of mycoplasma and actinomycetes (3h)

Unit – II

4. Genetic recombination in prokaryotes: conjugation, transformation and transduction (3h)
5. Role of microorganisms in biogeochemical cycling of nitrogen and carbon; biological N2 fixation (3h)
6. Industrial application of microorganisms: organic acids, alcohol, food processing, milk products, antibiotics, biopesticides (8h)

Unit – III

7. General account of plant pathogens: historical developments; general account of diseases caused by plant pathogens (2h)
8. Plant disease epidemiology: transmission and spread of plant pathogens; disease cycles; epidemics; modeling and diseases forecasting (6h)
9. Plant disease management: chemical; biological; development of transgenics; biopesticides (6h)

Unit – IV

10. Genetics of resistance and susceptibility: genes for virulence and avirulence, their application in resistance and susceptibility; inducted resistance (immunization) (4h)
11. Molecular plant pathology: molecular diagnosis; identification of genes and specific molecules in disease development; molecular manipulation of resistance (4h)
12. Application of information technology in plant pathology: General account (2h)

References:

1. Agrios, G.N. 1997. Plant Pathology. Academic Press, London.
2. Albajes, R., Gullino, M.L., Van Lanteren, J.C. & Elad, Y. 2000. Integrated Pest and Disease Management in Greehouse Crops. Kluwer Academic Publishers.
3. Bridge, P. et.al. 1998. Molecular Variability of Fungal Pathogens. CAB International, UK.
4. Bridge, P. et.al. 1999. Application of PCR in Mycology. CAB International, UK.
5. Persley, G.J. 1996. Biotechnologies and Integrated Pest Management, CAB International, UK.
6. Skerritt, J.H. and Apples, R. 1995. New Diagnostics in Crop Sciences. CAB International, UK.

KAKATIYA UNIVERSITY

U.G. Botany (Under CBCS)

B.Sc. Final Year (DSE-1E)

SEMESTER – V

Elective

C) Microbiology and Plant Pathology

Practical Syllabus

1. Cultivation media for autotrophic and heterotrophic microorganisms (3h)
2. Cleaning of glassware, mineral media, complex media, solid media, sterilization (9h)
3. Isolation of microorganisms: streaking on agar plates / pour plate method, isolation of clones (3h)
4. Preservation (3h)
5. Preparation of Winogradsky column using pond bottom mud, observations on temporal sequence of appearance of microbes (visual appearance) (6h)
6. Observation on Virus infected plants (symptoms) (6h)
7. Study of important plant pathogens (symptoms and host parasite relationship) (6h)
8. Isolation of pectolytic enzymes from diseased plants (6h)
9. Demonstration of biopesticides (essential oils, neem, turmeric and garlic) against some pathogens (3h)