

KAKATIYA UNIVERSITY
U.G. Skill Enhancement Course - IV
(Under CBCS)
B.Sc. Final Year
SEMESTER - VI
(FOR ALL SCIENCE FACULTY DEPARTMENTS)

QUANTITATIVE APTITUDE TEST

Credits: 2

Theory: 2 hours/week

Marks - 40

Unit – I ARITHMETICAL ABILITY

1.1 Arithmetical Ability: Ratio & Proportion

1.2 Arithmetical Ability: Time & Work, Time & Distance

1.3 Arithmetical Ability: Simple Interest, Compound Interest

1.4 Arithmetical Ability: Stocks & Shares

Unit – II DATA INTERPRETATION

2.1 Data Interpretation: Tabulation

2.2 Data Interpretation: Bar Graphs

2.3 Data Interpretation: Pie Charts

2.4 Data Interpretation: Line Graphs

Text Book: Quantitative Aptitude by Dr. R.S. Aggarwal

KAKATIYA UNIVERSITY
U.G. B.Sc. Final Year (Under CBCS)
Semester – VI: Generic Elective Paper-II
(FOR ALL SCIENCE FACULTY DEPARTMENTS)

WATER RESOURCES MANAGEMENT

UNIT-I

1. Importance of Natural Resources – Different Types Resources
2. Significance of Water Resources and their uses
3. Conservation of water and recycling of the water – Global distribution of water
4. Water shed programmes and their management
5. Storing the rain water in tanks and recharging ground water.

Unit-II

6. Rain water harvesting in rural areas (chekdam, trenches etc.,)
7. Over use of surface and ground water and control measures.
8. Aims, objectives and implementation of Mission Bhagiratha (Telangana Government Drinking water programme)
9. Aims, objectives and implementation of Mission Kakatiya (Telangana Government minor irrigation programme)
10. Issues and challenges in Water Resources Management

KAKATIYA UNIVERSITY
U.G. BOTANY (Under CBCS)
B.Sc. Final Year (DSC-1F)
SEMESTER – VI

Plant Physiology

DSC-1F (3hrs./week)

Theory Syllabus

Credits-3
(45 hours)

Unit – I

1. Water Relations: Importance of water to plant life, physical properties of water, diffusion, imbibition, osmosis; water, osmotic and pressure potentials; absorption, transport of water, ascent of sap; transpiration; Stomatal structure and movements. (7h)
2. Mineral Nutrition: Essential macro and micro mineral nutrients and their role; symptoms of mineral deficiency. (3h)
3. Translocation of organic substances: Mechanism of phloem transport; source-sink relationships. (2h)

Unit – II

4. Enzymes: Nomenclature, characteristics, mechanism and regulation of enzyme action, enzyme kinetics, factors regulating enzyme action. (4h)
5. Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect; concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; Factors effecting Photosynthesis, photophosphorylation (4h)
6. Carbon assimilation pathways: C₃, C₄ and CAM. (4h)

Unit – III

7. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation, pentose phosphate pathway. (6h)
8. Nitrogen Metabolism: Biological nitrogen fixation, nitrate reduction, ammonia assimilation, (GS-GOGAT, transamination) (4h)
9. Lipid Metabolism: Structure and function of lipids. (3h)

Unit – IV

10. Growth and Development: Physiological effects of phytohormones–Auxins, gibberellins, cytokinins, ABA, ethylene and Brassinosteroids (3h)
11. Physiology of flowering and photoperiodism. Role of Phytochrome in flowering. (3h)

12. Stress physiology: concept and plant responses to water, salt and temperature stresses (2h)

References:

1. Hopkins, W. G. 1995. Introduction to Plant Physiology. John Wiley & Sons Inc., New York, USA
2. Jain, J.L., S. Jain and Nitin Jain. 2008. Fundamentals of Biochemistry. S. Chand & Company Ltd., New Delhi.
3. Pandey, B. P. 2007. Botany for Degree Students: Plant Physiology, Biochemistry, Biotechnology, Ecology and Utilization of Plants. S. Chand & Company Ltd., New Delhi.
4. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc., USA.
5. Taiz, L. and E. Zeiger. 1998. Plant Physiology (2nd Ed.). Sinauer Associates, Inc., Publishers, Massachusetts, USA.
6. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.

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U.G. BOTANY (Under CBCS)
B.Sc. Final Year (DSC-1F)
SEMESTER – VI

Plant Physiology
Practical Syllabus

(45 hours)

1. Determination of osmotic potential of vacuolar sap by Plasmolytic method using leaves of *Rheodiscolor / Tradescantia.* (6h)
2. Determination of rate of transpiration using Cobalt chloride method (3h)
3. Determination of stomatal frequency using leaf epidermal peelings / impressions (6h)
4. Determination of catalase activity using potato tubers by titration method (6h)
5. Separation of chloroplast pigments using paper chromatography technique (12h)
6. Estimation of protein by Biurette method (6h)
7. Mineral deficiency- Detail study of Micronutrients and Macro nutrients (3h)
8. Identification of C₃, C₄ and CAM plants (3h)

KAKATIYA UNIVERSITY
U.G. BOTANY (Under CBCS)
B.Sc. Final Year (DSE-1F)
SEMESTER – VI

Elective I

A) Tissue Culture and Biotechnology

DSE-1F	(3 hrs./week)	Theory Syllabus	Credits-3 (45 hours)
Unit – I			
1.		Tissue culture: Introduction, sterilization procedures, explants, culture media – composition and preparation; Micropropagation.	(5h)
2.		Organ culture: Vegetative Organs-Root, Shoot, Leaf culture Reproductive Organs-Anther, Ovary, Ovule, Embryo culture	(6h)
3.		Callus culture, Cell and Protoplast culture	(4h)
Unit – II			
4.		Somatic hybrids and Cybrids.	(4h)
5.		Applications of tissue culture: Production of pathogen free plants and somaclonal variants, production of stress resistance plants, secondary metabolites and synthetic seeds.	(6h)
6.		Production of hairy roots and its applications in production of secondary metabolites.	(2h)
Unit – III			
7.		Biotechnology: Introduction, history, scope and applications.	(3h)
8.		rDNA technology: Basic aspect of of gene cloning, Enzymes used in gene cloning – Restriction enzymes, Ligases, Polymerases.	(4h)
9.		Gene cloning-Vectors – cloning vehicles (Plasmid , Cosmids, Bacteriophages, & Phasmids) application of r DNA technology.	(5h)
Unit – IV			
10.		Gene Libraries: Genomic Libraries, cDNA Libraries, Polymerase chain reaction and its applications.	(4h)
11.		Method of gene transfer in plants (<i>Agrobacterium</i> and Microprojectile)	(4h)
12.		Production of transgenic plants, Bt –application in cotton and brinjal. Application of Transgenic in crop improvement.	(3h)

References:

1. Balasubramanian, D., C. F. A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman. 2004.
2. Biotechnology. Universities Press (India) Private Limited, Hyderabad.
3. Channarayappa. 2007. Molecular Biotechnology – Principles and Practices. Universities Press
4. (India) Private Limited, Hyderabad.
5. Chawala, H. S. 2002. Introduction to Plant Biotechnology. Oxford & IBH Publishing Company,
6. New Delhi.
7. Dubey, R. C. 2001. A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi
8. Edmond, J. B., T. L. Senn, F. S. Adrews and R. J. Halfacre. 1977..
9. Jha, T.B. and B. Ghosh. 2005. Plant Tissue Culture – Basic and Applied. Universities Press
(India)
10. Private Limited, Hyderabad..
11. Ramawat, K. G. 2008. Plant Biotechnology. S. Chand & Company Ltd., New Delhi.
12. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth,
13. Thomson Learning Inc., USA..

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U.G. BOTANY (Under CBCS)
B.Sc. Final Year (DSE-1F)
SEMESTER – VI

Elective I

A) Tissue Culture and Biotechnology
Practical Syllabus

1. Estimation of plant DNA. (Tomato) (6h)
2. Production of synthetic seeds /Encapsulation of embryo (3 h)
3. Preparation of plant tissue culture medium. (6h)
4. Callus Micropropagation (3h)
5. Demonstration of Micropropagation/ multiple shoots (6h)
6. Anther culture (3 h)
7. PCR –Demonstration (3h)
8. Study of biotechnology products: Samples of antibiotics and vaccines (6h)
9. Photographs of transgenic plants – Bt Cotton, Bt –Brinjal. (3h)
10. Instruments used in Biotechnology lab- Autoclave, Laminar air flow, Hot air oven and Incubator. (6h)

KAKATIYA UNIVERSITY
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B.Sc. Final Year (DSE-1F)
SEMESTER – VI

Elective

B) Seed Technology

DSE-1F (3 hrs./week)

Theory Syllabus

Credits-3
(45 hours)

Unit – I

1. Seed: Structure and types. Seed dormancy: causes and methods of breaking dormancy. (4h)
2. Seed storage: Long term and short term storage. Orthodox and recalcitrant seeds.
Packing of seeds – Principles, practices, bagging and labeling. (3h)
3. Physico and Bio-chemical changes during seed storage. (2h)

Unit – II

4. Seed viability, factors affecting seed viability and genetic erosion. (3h)
5. Cultural practices and harvesting of Seed: Isolation, Sowing, Cultural practices, harvesting and threshing of the following crops: (a) Rice, (b) Cotton, (c) Sunflower (9h)
6. Seed Treatment to control seed borne disease –General account (3h)

Unit – III

7. Structure of pollen and ovule-Types of ovules, Collection and storage of pollen (3h)
8. Principles of hybrid seed production-Cross pollination, Emasculation, Self pollination, role of pollinators and their management. (5h)
9. Seed development in cultivated plants, seed quality concept, importance of genetic purity of seed. Hybrid seed production and Heterosis. (4h)

Unit – IV

10. Seed production technology; seed testing- Procedures of seed testing, seed testing laboratories and importance of seed testing. (3h)
11. Seed certification- History, Seed certification agency, Indian minimum, general and specific seed certification standard. (3h)
12. Seed banks- National, International and Millennium seed banks. (3h)

References:

1. Agrawal, P. K. 1993. Hand Book of Seed Technology. Dept. of Agriculture and Cooperation. National Seed Corporation Ltd., New Delhi
2. Balasubramanian, D., C. F. A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman. 2004. Biotechnology. Universities Press (India) Private Limited, Hyderabad.
3. Bedell, Y. E. Seed Science and Technology. Indian Forest Species. Allied Publishers Limited, New Delhi.
4. Channarayappa. 2007. Molecular Biotechnology – Principles and Practices. Universities Press (India) Private Limited, Hyderabad.
5. Chawala, H. S. 2002. Introduction to Plant Biotechnology. Oxford & IBH Publishing Company, New Delhi.
6. Dubey, R. C. 2001. A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi
7. Edmond, J. B., T. L. Senn, F. S. Adrews and R. J. Halfacre. 1977..
8. Hartman, H. T. and D. E. Kestler. 1976. Plant Propagation: Principles and Practices. Prentice & Hall of India, New Delhi.
9. Jha, T.B. and B. Ghosh. 2005. Plant Tissue Culture – Basic and Applied. Universities Press (India) Private Limited, Hyderabad..
10. Ramawat, K. G. 2008. Plant Biotechnology. S. Chand & Company Ltd., New Delhi.
11. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc., USA..
12. Tiwari, G. N. and R. K. Goal. Green House Technology – Fundamentals, Design, Modelling and Application. Narosa Publishing House, New Delhi.
13. Tunwar, N. S. and S. V. Singh. 1988. Indian Minimum Seed Certification Standards. The Central Seed Certification Board, Govt. of India, New Delhi.

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SEMESTER – VI

Elective

B) Seed Technology Practical syllabus

(45 hours)

1. Testing of seed viability using 2, 3, 5-triphenyl tetrazolium chloride (TTC). (3h)
2. Estimation of amylase activity of germinating seeds (Qualitatively). (3h)
3. Demonstration of seed dressing using fungicides to control plant diseases. (3h)
4. Demonstration of seed dressing using Biofertilizers (BGA) to enrich nutrient supply. (3h)
5. Emasculation, bagging of flower for hybrid seed production. (6h)
6. Dissection of Dicot embryo (bean) and Monocot embryo (maize). (6h)
7. Pollen viability test using Evan's blue staining. (*Hibiscus*). (3h)
8. Harvesting and Importance of following seeds:
Rice,
Maize,
Cotton,
Groundnut and
Sunflower. (6h)
9. Types of ovules: Orthotropous, Anatropous and Campylotropous. (3h)
10. Structure of pollen grains: *Hibiscus* and grass. (3h)
11. Study visits to research institutes, seed tests and certification laboratories and places seed banks. (6h)

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SEMESTER – VI

Elective

C) Bio-Control of Plant Diseases and Pests

DSE-1F	(3 hrs./week)	Theory Syllabus	Credits-3 (45 hours)
Unit – I			
1.		Introduction to various approaches to the control of Pests and Diseases of Plants	(4h)
2.		Biological Control of Fungal Diseases	(3h)
3.		Biological Control of Bacterial and Viral Diseases of Plants	(4h)
Unit – II			
4.		Pheromones and Semi-chemicals	(4h)
5.		Botanical Insecticides	(3h)
6.		Plant Parasitic Nematodes: Introduction, Susceptible response of Plants to Nematodes and Control of Nematodes	(4h)
Unit – III			
7.		Progress towards commercialization of Baculovirus Insecticides	(4h)
8.		Biology of Bacteria and Fungi used for control of Weeds	(4h)
9.		Genetic Engineering approaches for Weed Resistance	(4h)
Unit – IV			
10.		Integrated Pest management Strategies	(4h)
11.		Insect Growth Regulators	(3h)
12.		Regulatory aspects of Biological Control Agents	(4h)

References:

- 1) Campbell R. 1989. Biological Control of Microbial Plant Pathogens. Cambridge Univ. Press, Cambridge.
- 2) Cook RJ & Baker KF. 1983. Nature and Practice of Biological Control of Plant Pathogens. APS, St. Paul, Minnesota.
- 3) Dhaliwal GS and Arora R.1994. Trends in Agriculture insect pest management. Common wealth Publishers, New Delhi.
- 4) Fokkemma MJ. 1986. Microbiology of the Phyllosphere. Cambridge Univ. Press, Cambridge.
- 5) Gnanamanickam SS (Eds). 2002. Biological Control of Crop Diseases. CRC Press, Florida.
- 6) Heikki MT & Hokkanen James M (Eds.). 1996. Biological Control - Benefits and Risks. Cambridge Univ. Press, Cambridge.
- 7) Mukerji KG, Tewari JP, Arora DK & Saxena G. 1992. Recent Developments in Biocontrol of Plant Diseases. Aditya Books, New Delhi.
- 8) Mukherji KG and Chincholkar SB.2006. Biological control of plant diseases. Heaworth Food and Agricultural Products Press, New Delhi.
- 9) Sharma PD.1993.Environmental Biology and Toxicology. Rastogi and company

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SEMESTER – VI

Elective

C) Bio-Control of Plant Diseases and Pests
Practical Syllabus

(45 hours)

1. Extraction of Biopesticide from *Neem/Annona*. (6h)
2. Extraction of Biopesticide from *Tagetes/Chrysanthemum*. (6h)
3. Formulation of Biopesticide from fungal organism (*Trichoderma* spp.). (6h)
4. Formulation of Biopesticide from Bacteria (*Bacillus thuringiensis/Pseudomonas* spp.)(9h)
5. Improved technique and staining of plant tissues for detection of plant nematodes.(6h)
6. Identification of disease based on the histo-pathogenesis. (6h)
7. Formulation of viral Biopesticide (*Nuclear Polyhedrosis Virus*) (6h)