UNIVERSITI TEKNOLOGI MARA

AGA112: PROPAGATION TECHNIQUES

Course Name (English)	PROPAGATION TECHNIQUES APPROVED
Course Code	AGA112
MQF Credit	3
Course Description	The course contains principles of plant propagation using seeds, cuttings, grafting, budding, layering, and specialized stem and root. The physiological basis of propagation is described. Knowledge of plant growth and physiology is needed.
Transferable Skills	Knowledge gained from lecturers via discussion with lecturers and practical skills from Laboratory Work.
Teaching Methodologies	Lectures, Lab Work, Case Study, Discussion, Self-directed Learning, Peer Practice
CLO	CLO1 Describe the biology of plant propagation and the methods of asexual and sexual plant propagation with examples CLO2 Demonstrate knowledge of the importance and application of plant propagation methods in the herbal production industry. CLO3 Conduct greenhouse operations including monitoring climate controls, irrigation, and pest.
Pre-Requisite Courses	No course recommendations

Topics
1. Introduction 1.1) 1.1 The Evolution of Plant Propagation in Human Society 1.2) 1.2 Biology of Plant Propagation 1.3) 1.2.1 Morphology and Anatomy of Plants 1.4) 1.2.2 Plant Biological Life Cycle 1.5) 1.2.3 Cell Division
2. Biology And Environment Factors 2.1) 2.1 Biological Factors 2.2) 2.1.1 Pathogen and Pest 2.3) 2.2 Environmental Factors 2.4) 2.2.1 Light, Water-Humidity Control, Temperature, Gas and Gas Exchange 2.5) 2.2.2 Greenhouse Propagation
3. Types of Plant Propagation 3.1) 3.1 Sexual Propagation 3.2) 3.1.1 Self-Pollination 3.3) 3.1.2 Cross-Pollination 3.4) 3.2 Asexual Propagation
4. Seed Propagation 4.1) 4.1 Principles of Seed Propagation 4.2) 4.1.1 The Germination Process 4.3) 4.1.2 Seed Dormancy 4.4) 4.1.3 Seed Viability and Vigor 4.5) 4.1.4 Seed Storage 4.6) 4.2 Technique of Propagation by Seeds 4.7) 4.2.1 Seed Testing 4.8) 4.2.2 Seed Treatments to Improve Germination 4.9) 4.2.3 Field Seeding 4.10) 4.2.4 Field Nurseries for Transplant Production 4.11) 4.2.5 Production to Transplant Under Shaded Conditions 4.12) 4.2.6 Transplanting Seedling Material to Field Planting Area

5. Vegetative Propagation 5.1) 5.1 Principles of Propagation by Cuttings 5.2) 5.1.1 Adventitious Root and Bud/Shoot Formation 5.3) 5.1.2 Treatment of Cuttings 5.4) 5.1.3 Environmental Manipulation of Cuttings 5.5) 5.2 Principles of Budding and Grafting 5.6) 5.2.1 Terminology Budding and Grafting 5.7) 5.2.2 Seedling and Clonal Rootstock Systems 5.8) 5.2.3 Reasons for Grafting and Budding 5.9) 5.2.4 Formation of Graft Union 5.10) 5.2.5 Factor Influencing Graft Union Success
6. Propagation by Cuttings 6.1) 6.1 Types of Cuttings 6.2) 6.2 Sources of Cutting Materials 6.3) 6.3 Rooting Media 6.4) 6.4 Treating Cuttings with Auxins
7. Grafting Techniques 7.1) 7.1 Requirements for Successful Grafting 7.2) 7.2 Types of Grafts 7.3) 7.3 Preparation for Grafting 7.4) 7.4 Aftercare of Grafted Plants
8. Budding Techniques 8.1) 8.1 Important and Utilization of Budding 8.2) 8.2 Rootstocks for Budding 8.3) 8.3 Types of Budding
9. Layering 9.1) 9.1 Simple Layering 9.2) 9.2 Tip Layering 9.3) 9.3 Compound (serpentine) Layering 9.4) 9.4 Mound (stool) Layering 9.5) 9.5 Air Layering 9.6) 9.6 Natural Forms of Layering
10. Propagation by Specialized Stems and Roots 10.1) 10.1 Bulbs 10.2) 10.2 Corms 10.3) 10.3 Tubers 10.4) 10.4 Tuberous Roots and Stems 10.5) 10.5 Rhizomes 10.6) 10.6 Pseudobulbs

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	Students are given an assignment related to the green house operation.	10%	CLO3
Test	Online Test	30%	CLO1
Written Report	Virtual laboratory works on plant propagation techniques through video. Students have to produce written reports according to the video.	20%	CLO2

Reading List

Recommended Text

- **Hartmann,H.T., Kester, D.E., Davies, T.J. Jr, and . Geneve, R.L. 1997, *Plant Propagation: Principles and Practices*, Sixth Edition Ed., Published by Prentice-Hall Inc**
- **Trigiano R.N. and. Gray, D.J. 2005, *Plant Development and Biotechnology*, Published by CRC Press.**
- **Stern, K.R., Bidlack, J.E. and Jansky, S.H. 2008, *Introductory Plant Biology*, 11th edition Ed., Published by McGraw-Hill**
- **Smith, M. 2007, *Plant Propagator's Bible*, Rodale Inc., Emmaus, PA**
- **McMahon et al. 2011, *Plant Science. Growth, Development and Utilization of Cultivated Plants*, 5th edition Ed., Pearson Edition, Inc**
- **Arbury et al. 1997, *The Complete Book of Plant Propagation*, The Taunton Press, Newtown, CT.**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources