



LANDMARK UNIVERSITY, OMU-ARAN

CRP 212 COURSE COMPACT

COLLEGE: AGRICULTURAL SCIENCES
DEPARTMENT: CROP AND SOIL SCIENCE
PROGRAMME: B.SC AGRICULTURE
COURSE COMPACT FOR: CRP 212

COURSE

COURSE CODE: CRP 212
COURSE TITLE: Anatomy, Taxonomy and Physiology of Agricultural Plant
CREDIT UNIT: 3 Units
COURSE STATUS: COMPULSORY

LECTURER'S DATA

NAME OF THE LECTURER: DR. C. M. ABOYEJI
QUALIFICATIONS OBTAINED: B.AGRIC. (ILORIN); M.SC. AGRONOMY (ZARIA);
MBA.

(LAUTECH); PGDE (ZARIA), PH.D. AGRONOMY
(ILORIN)

DEPARTMENT: CROP AND SOIL
COLLEGE: AGRICULTURAL SCIENCES
E-MAIL: ABOYEJI.CHRISTOPHER@LMU.EDU.NG
OFFICE LOCATION: B008

CONSULTATION HOURS: MONDAYS 2-4
TUESDAYS 1-3
THURSDAYS 1-3

NAME OF THE LECTURER: DR. S.A. IGE
QUALIFICATIONS OBTAINED: B. Agric, M.Sc (Plant breeding and Genetics)
Ph.D. (Agronomy)

DEPARTMENT: CROP AND SOIL
COLLEGE: AGRICULTURAL SCIENCES
E-MAIL: IGE.SUNDAY@LMU.EDU.NG
OFFICE LOCATION: B005

CONSULTATION HOURS: TUESDAYS 1-3
THURSDAYS 1-3

INTRODUCTION TO THE COURSE

COURSE DESCRIPTION: CRP212 PROVIDES THE BASIC KNOWLEDGE ON WHOLE PLANT STUDY HIGHLIGHTING ON: PLANT ANATOMY (DESCRIBES THE INTERNAL STRUCTURES PLANTS AND OR PLANT PARTS), CLASSIFICATION, CHARACTERISTICS, DISTRIBUTION AS WELL AS ECONOMIC IMPORTANCE; GENERAL PHYSIOLOGICAL ATTRIBUTES OF PLANTS (ENZYMES, PHOTOSYNTHESIS AND TRANSLOCATION, POLLINATION, RESPIRATION AND ENERGY UTILIZATION, SEED DORMANCY AND GERMINATION, DEVELOPMENT, MINERAL NUTRITION) AS THEY AFFECT CROP PRODUCTION.

COURSE JUSTIFICATION: THE COURSE WILL INTRODUCE STUDENTS TO BASIC BOTANY USEFUL IN THE STUDY OF PLANTS BODY, CLASSIFICATION OF CULTIVATED

PLANTS AND HOW PLANTS FUNCTION TO PRODUCE DRY MATTER FOR THE NEED OF MAN. THE COURSE WILL EXPOSE STUDENTS ON THE INTERNAL STRUCTURE (ENDOMORPHOLOGY) OF PLANTS (CELLS, TISSUES AND ORGANS); THEIR MODIFICATIONS AND THE IMPLICATIONS FOR THE GEOGRAPHICAL DISTRIBUTION OF CROPS AND INTRODUCES THE FUNCTION PROCESSES IN PLANTS. STUDENTS WILL LEARN THE BASIS FOR THE DESCRIPTION, CLASSIFICATION, IDENTIFICATION AND NAMING OF PLANTS, THIS IS CALLED PLANT SYSTEMATIC. THE BIOCHEMICAL PROCESSES WHICH OCCUR WITHIN THE PLANT AND THEIR INTERACTIONS AS THEY AFFECT CROP ESTABLISHMENT, ASSIMILATE PRODUCTION AND UTILIZATION AND DRY MATTER ACCUMULATION. ACQUIRING THE KNOWLEDGE WILL EQUIP STUDENTS TO HAVE UNDERSTANDING ABOUT PLANTS DIFFERENT FUNCTIONALITY AND USE THE KNOWLEDGE TO ADDRESS DIFFERENT PROBLEMS AFFECTING PLANT IN ATTAINING THEIR ECONOMIC POTENTIALS FOR INCREASED FOOD PRODUCTION.

COURSE OBJECTIVES: AT THE END OF THE COURSE, STUDENTS SHOULD UNDERSTAND:

- DEVELOPMENT OF CELLS AND TISSUES, AND THE COMPARATIVE ANATOMY OF MAJOR PLANT ORGANS
- MORPHOLOGY, TAXONOMY AND COMMODITY GROUPINGS OF IMPORTANT PLANTS IN AGRICULTURE AND FORESTRY
- PLANT DEVELOPMENT, GERMINATION AND DORMANCY, PHOTOSYNTHESIS, RESPIRATION, TRANSLOCATION, ENERGY UTILIZATION, WATER RELATIONS AND MINERAL NUTRITION OF PLANTS.

COURSE CONTENT:

COURSE EXPECTATIONS:

S/N	GRADING	SCORE(%)
1.	CONTINUOUS ASSESSMENTS	
	• C.A I	7%
	• C.A II (MID-SEMESTER TEST)	15%
	• C.A III	8%
2.	ASSIGNMENT	10%
3.	PRACTICAL (LABORATORY WORK)/ CASE STUDIES	
4.	FINAL EXAMINATION	60%
5.	TOTAL	100

COURSE DELIVERY STRATEGIES:

1. Lecturing method through power point presentation.
2. Laboratory Practical and field work.

COURSE DURATION:

LECTURE CONTENT

MODULE 1 (WEEKS 1-7)

WEEK 1: TOPIC FOR THE WEEK

PARTS OF THE PLANT CELL TYPES

OBJECTIVES

Students would have clear understanding of how plants develop from simple cells

➤ **DESCRIPTION**

FIRST HOUR: INTRODUCTION TO PLANT ANATOMY

SECOND HOUR: TYPES OF PLANT CELLS

➤ **STUDY QUESTION:**

- I. WHAT DID YOU UNDERSTAND BY PLANT ANATOMY
- II. MENTION FIVE CELL PARTS AND THEIR CORRESPONDING FUNCTIONS

READING LIST –

- ✓ Fahn,A.(1977).Plant anatomy. Printed in Great Britain by Page Bros(Norwich)Ltd.Norwich.Second edition.ISBN0-08-017242-3.611pp.

WEEK 2

TOPIC: COMPARATIVE ANATOMY OF LEAVES AND MAJOR PLANT TISSUES

OBJECTIVES: IDENTIFY AND DIFFERENTIATE DIFFERENT PLANTS TISSUES, THEIR COMPOSITION AND HOW THEY FUNCTION AND THEIR IMPORTANCE.

➤ **DESCRIPTION**

FIRST HOUR: COMPARATIVE ANATOMY OF LEAVES

SECOND HOUR: ANATOMY OF MAJOR PLANT TISSUES

➤ **STUDY QUESTION:**

- I. WITH THE AID OF DIAGRAM EXPLAIN THE THREE TYPES OF PLANT TISSUE SYSTEMS
- II. DRAW THE CROSS SECTION OF A LEAF AND LABEL

READING LIST –

- ✓ Fahn,A.(1977).Plant anatomy. Printed in Great Britain by Page Bros(Norwich)Ltd.Norwich.Second edition.ISBN0-08-017242-3.611pp.
- ✓ Ogunyemi,S.,Awodoyin,R.O.,Togun,A.O. and Odeleye,F.O.(2002).Inrtoduction to Crop Taxonomy, Anatomy and Physiology. Ibadan External Studies Programme Series.Published by:The center for External Studies, University of Ibadan,Ibadan.136pp

WEEK 3

TOPIC: INTRODUCTORY PLANT TAXONOMY.

OBJECTIVES: STUDENTS WOULD HAVE LEARNT THE FOLLOWING

1. APPRECIATE THE BASIS FOR CLASSIFICATION OF PLANTS.
2. ACQUIRE SOME UNDERSTANDING OF SYSTEMIC BOTANY (TAXONOMY)
3. UNDERSTAND SOME OF THE RELEVANT TERMS USED IN PLANT TAXONOMY.
4. KNOWLEDGE IN THE USE OF KEY AND OTHER DEVICES IN THE IDENTIFICATION AND NAMING OF PLANT.

➤ **DESCRIPTION**

FIRST HOUR: PLANT TAXONOMY AND SYSTEMIC BOTANY

SECOND HOUR: BINOMIAL NOMENCLATURE

➤ **STUDY QUESTION:**

- I. WHY DO WE STUDY PLANT TAXONOMY?
- II. WHAT ARE THE UNITS OF PLANT CLASSIFICATIONS?

- III. DEFINE THE FOLLOWING TERMS- TAXA, SPECIES, CLASSIFICATION, IDENTIFICATION
- IV. DESCRIBE FIVE PRINCIPLES OF PLANT CLASSIFICATION

READING LIST –

- ✓ Ogunyemi, S., Awodoyin, R.O., Togun, A.O. and Odeleye, F.O. (2002). Introduction to Crop Taxonomy, Anatomy and Physiology. Ibadan External Studies Programme Series. Published by: The center for External Studies, University of Ibadan, Ibadan. 136pp

WEEK 4

TOPIC: CHARACTERISTICS, DISTRIBUTION, ECONOMIC IMPORTANCE AND LOCAL EXAMPLES OF FABACEAE AND POACEAE

OBJECTIVES: STUDENTS WOULD HAVE LEARNT ABOUT THE ADAPTABILITY AND CULTIVATION OF FABACEAE (COWPEA AND SOYBEAN) AND POACEAE (MAIZE AND RICE)

➤ **DESCRIPTION**

FIRST HOUR: CHARACTERISTICS, DISTRIBUTION, ECONOMIC IMPORTANCE AND LOCAL EXAMPLES OF FABACEAE.

SECOND HOUR: CHARACTERISTICS, DISTRIBUTION, ECONOMIC IMPORTANCE AND LOCAL EXAMPLES OF POACEAE

➤ **STUDY QUESTION:**

- I. WITH THE AID OF THE LEAVES, GROWTH HABIT, ROOTS AND FRUITS DESCRIBE THE CHARACTERISTICS OF FABACEAE FAMILY
- II. GIVE FIVE EXAMPLES OF PLANTS UNDER FABACEAE.
- III. DESCRIBE THE ECONOMIC IMPORTANCE OF POACEAE FAMILY
- IV. MENTION FIVE COMMON SPECIES OF POACEAE FAMILY

READING LIST –

- ✓ Ogunyemi, S., Awodoyin, R.O., Togun, A.O. and Odeleye, F.O. (2002). Introduction to Crop Taxonomy, Anatomy and Physiology. Ibadan External Studies Programme Series. Published by: The center for External Studies, University of Ibadan, Ibadan. 136pp

WEEK 5

TOPIC: CHARACTERISTICS, DISTRIBUTION, ECONOMIC IMPORTANCE AND LOCAL EXAMPLES OF ASTERACEAE AND DIOSCORACEAE

OBJECTIVES: STUDENTS WOULD HAVE LEARNT ABOUT THE ADAPTABILITY AND CULTIVATION OF ASTERACEAE (SUNFLOWER) AND DIOSCORACEAE (YAM)

DESCRIPTION

FIRST HOUR: CHARACTERISTICS, DISTRIBUTION, ECONOMIC IMPORTANCE AND LOCAL EXAMPLES OF ASTERACEAE.

SECOND HOUR: CHARACTERISTICS, DISTRIBUTION, ECONOMIC IMPORTANCE AND LOCAL EXAMPLES OF DIOSCORACEAE

- **STUDY QUESTION:** DESCRIBE THE ECONOMIC IMPORTANCE OF THE TWO FAMILIES AND GIVE THE CORRESPONDING LOCAL EXAMPLE FOR EACH.

READING LIST –Ogunyemi,S.,Awodoyin,R.O.,Togun,A.O. and deleye,F.O.(2002).Inrtoduction to Crop Taxonomy,Anatomy and Physiology. Ibadan External Studies Programme Series.Published by:The center for External Studies, University of Ibadan,Ibadan.136pp

WEEK 6

TOPIC: PRACTICAL; PLANT IDENTIFICATION THROUGH MORPHOLOGICAL STRUCTURES OF DIFFERENT PLANT PARTS (LEAF FORMS, BRANCH ARRANGEMENT, STEM, ROOT AND FLOWER).

OBJECTIVES: (I) STUDENTS SHOULD BE ABLE TO IDENTIFY PLANTS THROUGH MORPHOLOGICAL STRUCTURES
(II) USE OF HAND LENS, MICROSCOPE, PREPARING AND IDENTIFICATION OF DIFFERENT PLANT INTERNAL STRUCTURES (CELL AND TISSUES) OF LEAF, STEM AND ROOT OF MONOCOTYLEDONOUS AND DICOTYLEDONOUS PLANTS.

➤ **DESCRIPTION**

FIRST HOUR: PLANT IDENTIFICATION THROUGH MORPHOLOGICAL STRUCTURES OF LEAF FORMS AND BRANCH ARRANGEMENT.

SECOND HOUR: PLANT IDENTIFICATION THROUGH MORPHOLOGICAL STRUCTURES OF STEM, ROOT AND FLOWER).

➤ **STUDY QUESTION:**

- I. DESCRIBE THE INTERNAL STRUCTURE OF A KNOWN PLANT STEM
- II. DIFFERENTIATE BETWEEN MONOCOT AND DICOT LEAF

READING LIST -

- ✓ Ogunyemi,S.,Awodoyin, R.O.,Togun,A.O. and Odeleye,F.O.(2002).Inrtoduction to Crop Taxonomy, Anatomy and Physiology. Ibadan External Studies Programme Series.Published by:The center for External Studies, University of Ibadan,Ibadan.136pp

WEEK 7

TOPIC: REVISION AND TEST

OBJECTIVES: TO PROVIDE TIME FOR STUDENTS TO READ WHAT THEY HAVE BEEN TAUGHT AND ASK QUESTIONS WHERE THERE IS DOUBT FOR CLARIFICATION.
(II) ALSO TO TEST STUDENTS UNDERSTANDING OF THE TOPIC BEFORE EXAMINATION

MODULE 2 (WEEKS 8-14)

WEEK 8

TOPIC: ROLE OF LIGHT, TEMPERATURE, AIR, AND WATER ON PLANT PERFORMANCE

OBJECTIVES: AT THE END OF THE LECTURE, THE STUDENTS SHOULD BE ABLE TO UNDERSTAND THE EFFECTS OF LIGHT, TEMPERATURE, AIR, AND WATER ON PLANT GROWTH.

- **DESCRIPTION**
FIRST HOUR: ROLE OF LIGHT AND TEMPERATURE ON PLANT PERFORMANCE
SECOND HOUR: ROLE OF AIR AND WATER ON PLANT PERFORMANCE

- **STUDY QUESTION:**
- I. HOW DOES LIGHT INFLUENCE PLANT GROWTH?
 - II. WHAT ARE THE THREE PHOTOPERIOD RESPONSE GROUPS?
 - III. HOW DOES TEMPERATURE INFLUENCE PLANT GROWTH?
 - IV. WHY IS AIR IMPORTANT TO PLANT GROWTH?
 - V. WHAT IS A GOOD RULE OF THUMB TO FOLLOW WHEN WATERING?

READING LIST –

- ✓ Fundamentals of plant physiology for degree, post graduate and various competitive examinations by V.K. JAIN. S.Chand & Co. LTD. 9th ED. 2007.

WEEK 9

TOPIC: DORMANCY, GERMINATION AND DEVELOPMENT

OBJECTIVES: THE STUDENTS AT THE END OF THE LECTURES FOR THE WEEK SHOULD BE ABLE

TO:

1. DEFINE DORMANCY AND ITS IMPORTANCE
2. KNOW DIFFERENT TYPES, CAUSES AND METHODS OF BREAKING DORMANCY
3. KNOW WHAT SEED GERMINATION IS ALL ABOUT
4. KNOW THE IMPORTANCE AND FACTORS AFFECTING SEED GERMINATION
5. KNOW TYPES OF SEED GERMINATION
6. DIFFERENTIATE BETWEEN SEED GERMINATION AND SEED DEVELOPMENT

- **DESCRIPTION**
FIRST HOUR: SEED DORMANCY.

SECOND HOUR: SEED GERMINATION AND DEVELOPMENT

STUDY QUESTION:

- I. *WRITE SHORT NOTE ON DORMANCY AND CAUSES OF DORMANCY IN SEED*
- II. *DESCRIBE THREE METHODS OF BREAKING SEED DORMANCY*
- III. *DESCRIBE METHODS OF GERMINATION IN MONOCOT PLANT*
- IV. *WHAT DO YOU UNDERSTAND PLANT DEVELOPMENT*

READING LIST -

- i. *Mohammad Pessarakli. (2001). Handbook of Plant and Crop Physiology*
- ii. Bewley JD, Black M. Seeds: Physiology of Development and Germination. New York: Plenum, 1985.
- iii. Bradbeer JW. Seed Dormancy and Germination. London: Blackie & Son, 1988.

WEEK 10

TOPIC: PLANT POLLINATION

OBJECTIVES: THE STUDENTS AT THE END OF THE LECTURE WILL UNDERSTAND:

1. PARTS AND TYPES OF A FLOWER
2. METHODS OF POLLINATION
3. FEATURES OF METHODS OF POLLINATION
4. IMPORTANCE OF POLLINATION

➤ **DESCRIPTION**

FIRST HOUR: FLOWER MORPHOLOGY

SECOND HOUR: POLLINATION IN FLOWER AND ITS METHODS

STUDY QUESTION:

- I. DIFFERENTIATE BETWEEN ANGIOSPERM AND GYMNOSPERM
- II. DRAW AND LABEL THE FEMALE REPRODUCTIVE ORGAN
- III. DESCRIBE FOUR TYPES OF FLOWER

READING LIST - V.K. JAIN. S. Chand & Co. LTD. 13th ED. 2010. *Fundamentals of plant physiology for degree, post graduate and various competitive examinations.*

WEEK 11

TOPIC: PHOTOSYNTHESIS IN PLANT.

OBJECTIVES: THE STUDENTS AT THE END OF THE LECTURES WILL GET TO:

1. UNDERSTANDING RELATIONSHIP BETWEEN PHOTOSYNTHESIS AND YIELD
2. UNDERSTANDING MECHANISM OF PHOTOSYNTHESIS
3. UNDERSTANDING FACTORS AFFECTING PHOTOSYNTHESIS
4. COMPARATIVE ANALYSIS OF C₃, C₄ AND CAM
5. PHOTOSYNTHESIS, CARBON SEQUESTRATION AND ENVIRONMENTAL HEALTH

➤ **DESCRIPTION**

FIRST HOUR: MECHANISM OF PHOTOSYNTHESIS AND FACTORS AFFECTING PHOTOSYNTHESIS.

SECOND HOUR: COMPARATIVE ANALYSIS OF C₃, C₄ AND CAM.

➤ **STUDY QUESTION:**

- DESCRIBE THE MECHANISM BY WHICH PLANTS CONVERT CO₂ TO CARBOHYDRATES.
- WHY SOME PLANTS ARE CALLED C₃ AND OTHERS C₄? WHAT ARE THE MORPHOLOGICAL AND BIOLOGICAL CHARACTERISTICS?

READING LIST - V.K. JAIN. S. Chand & Co. LTD. 13th ED. 2010. *Fundamentals of plant physiology for degree, post graduate and various competitive examinations.*

WEEK 12

TOPIC: TRANSLOCATION IN PLANT AND PLANT ENZYMES

OBJECTIVES: STUDENTS WOULD HAVE LEARNT ABOUT THE:

- I. MECHANISM OF TRANSLOCATION
- II. TYPES OF PLANT ENZYMES
- III. WHAT HAPPENS IN TRANSLOCATION
- IV. ORGAN OF TRANSLOCATION

➤ **DESCRIPTION**

FIRST HOUR: TRANSLOCATION IN PLANT

SECOND HOUR: PLANT ENZYMES

STUDY QUESTION:

1. WHAT ARE PLANT ENZYMES
2. LIST FOUR TYPES OF PLANT ENZYMES.
3. DESCRIBE THE MECHANISM TRANSLOCATION IN PLANT
4. WHAT IS TRANSLOCATION IN PLANTS

READING LIST - *V.K. JAIN. S. Chand & Co. LTD. 13th ED. 2010. Fundamentals of plant physiology for degree, post graduate and various competitive examinations.*

WEEK 13

TOPIC: RESPIRATION AND ENERGY UTILIZATION IN PLANTS

OBJECTIVES: STUDENTS WOULD HAVE LEARNT ABOUT THE:

1. THE IMPORTANCE OF RESPIRATION TO CROP YIELD
2. MECHANISM OF RESPIRATION IN PLANT CELL AND GASEOUS EXCHANGE IN FLOWERING PLANTS
3. IMPORTANCE ATTRIBUTED TO GLYCOLYSIS AND KREBS' CYCLE IN THE METABOLISM OF

WEEK 14: REVISION

WEEK 15: TEST

WEEK 16: EXAM

OBJECTIVES: STUDENTS ARE TO BE EXAMINED TO PROVIDE A SORT OF FEEDBACK FROM THE RECEIVER TO SENDER OF INFORMATION ON HORTICULTURAL PRODUCTION. EXAMINATION IS CONDUCTED TO ESTABLISH THE LEVEL OF KNOWLEDGE AND SKILLS ACQUIRED BY THE STUDENTS.