MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF PUBLIC HEALTH BIOMEDICAL SCIENCES AND TECHNOLOGY (SPHBST)

COURSE OUTLINE
Department: Medical Laboratory Sciences
Programme: Bachelor of Science in Medical Biotechnology

Course code: BMB 315: Course Title: Medicinal Plant Biotechnology
Year of Study: Year 3 Semester 1 Academic Year 2019/2020

Course Instructor: Mr. Peter K. Nyongesa (Msc Medical Biotechnology)

Date: September-December 2019

1. Introduction

This course is designed to introduce the learner to the principles of Medicinal Plant Biotechnology and its applications in the field of Medical Biotechnology

2. COURSE DESCRIPTION

Introduction, Definitions, Historical developments in Medicinal Plant Biotechnology, Medicinal Plants in Indigenous Systems: Institutionalized - Ayurveda, Siddha, Unani and Homeopathy. Non-institutionalized – Ethnomedicine.Plants in folklore with special reference to India etc.Recent advances in Medicinal Plant Biotechnology. Drugs Developed from traditional medicines. Traditional medicines under trial for developing drugs. The role of ethnobotany in relation to drug discovery in Kenya.. Role of Biotechnology for Protection of Endangered Medicinal Plants .Micropropagation - Preparativestage: Germplasm acquisition and Selection of explant. Establishment stage: axenic and viable cultures. Multiplication stage. Plantlet production: induction of root and acclimatizationof plantlets to greenhouse conditions. Establishment under field conditions. Somatic embryogenesis, synthetic seed technology. Somaclonal variations.In vitro production of secondary metabolites. Cell suspension, callus and protoplast culture, cell line selection and mass culture. Factors affecting product synthesis. Manipulation of culture media, metabolic sinks. Hormones, precursor feeding (L, codeinone) elicitation. Introduction to metabolic engineering for improving secondary metabolite productivity.Recent advances in plant biotechnology and genetic engineering for production of secondary metabolites

3. Learning outcomes

By the end of the course the learner will be able to:

1. Describe the historical developments and use of medicinal plants in the folk medicine

2. Describe the different groups of medicinal plants including the biological classification of the medicinal plants used in the traditional medicine and now
3. Describe the conservation methods of the endangered medicinal plants
4. Describe the cultivation trends of the medicinal plants including Micropropagation and other tissue culture methods e.g. hybridization
5. Describe the use of plant tissue culture cell to produce secondary metabolites
6. Describe the extraction methods of the secondary metabolites from the plant cell cultures and other plants
7. Describe the current and future trends in medicinal plant biotechnology

4. Rationale

There is a rapid technological advancement in life sciences that requires a sound understanding of the medicinal plants so as to apply the knowledge acquired from traditional medicine and their current use in Biomedical Sciences for drug discovery and other innovations.

5. TEACHING-LEARNING STRATEGIES

Overview Lectures
Group work and presentations
Laboratory practicals
Small-group Tutorial Discussions
Individual reading assignments
Self-directed Learning
Field trips

6. Topic Outline

Week	Topic	Activities
1	Introduction to history of medicinal plants in traditional medicine;	Lectures, Group work
2	Types of pharmacopoeia in traditional medicines across the world and the use of medicinal plants	Lectures, Group work
3	Classification of medicinal plants and related plant species in traditional medicine.	Lectures, discussions
3-5	Conservation strategies of medicinal plants; Case studies in Kenya	Lectures, discussions
6	Cultivation of medicinal plants Micropropagation, tissue cultures, Cell cultures	Lectures, discussions Practicals
7	**CAT ONE**	
8-10	Extractions of plant metabolites and methods of isolations and screening of the metabolites	Lectures, discussions Practicals
11-12	Recent and future trends of medicinal plants in drug bioprosepecting	Group work, lectures, discussion.

13	**CAT TWO**	
14-16	**MAIN EXAMS**	Lectures, discussions

Teaching-Learning Strategies
Overview Lectures, Reading assignments and presentations, E-learning/Moodle, Laboratory practicals, Group discussions, Self-directed Learning, Field trips.

Assessment of Learning

Continuous Assessment Tests	40%
Final Examination	60%
Total	100%

References

1. IUCN, 2011. Selected Medicinal Plants of Chittagong Hill Tracts
2. C.P Khare, 2004' Indian Medicinal Plants

Signing and Approval

Prepared by Course Lecturer:

Name: Peter Nyongesa
Sign……Date……..

Contacts: Email: pkuloba@mmust.ac.ke Phone: 0722640520

Lecturer: Mr. Peter K. Nyongesa (Msc):

Sign……Date…….

Approved by COD:

Name: Fidelis Mambo
Sign……..Date…….