SIKSHA 'O' ANUSANDHAN
(DEEMED TO BE UNIVERSITY)

COURSES OF STUDIES

FOR

M.Sc. IN MEDICINAL AND AROMATIC PLANTS

SEMESTER SYSTEM

KHANDAGIRI SQUARE, PO- KHANDAGIRI
BHUBANESWAR – 751030
SIKSHA 'O'ANUSANDHAN DEEMED TO BE UNIVERSITY

M.Sc. MEDICINAL AND AROMATIC PLANTS
(With Effect from 2019-2020 Admission Batch)

FACULTY OF PHARMACEUTICAL SCIENCES, SPS, SIKSHA 'O' ANUSANDHAN **(DEEMED TO BE UNIVERSITY)**
Programme Educational Objectives (PEOs) of M.Sc. Medicinal and Aromatic Plants
1. To enable the students to gain knowledge on medicine systems used to treat types of ailments.
2. To make the students familiarize with skills for identification, preservation and commercialization of plants.
3. To develop the students understanding on plants growth, multiplication, supporting ecological conditions and regulation using bio-regulators.
4. To understand and advance the science behind use of medicinal and aromatic plants for development of herbal products and health care.
5. To enable the students to apply the skills learned during the programme for breeding of plants, improvement of genotypes, isolation of active compounds from plant extracts and to design products or formulations.
6. To prepare students to assume leadership to address the challenging issues of industry and health care system on the basis of scientific spirit.
7. To create base for analysis of data while addressing the challenges of innovation in pharmaceutical industry and health care systems.

Programme Outcomes (POs) of M.Sc. Medicinal and Aromatic Plants	
1.	The students will develop the ability to identify and justify medicinal values of plant resources.
2.	They will be able to do preservation and commercial utilization of medicinal and aromatic plants.
3.	It helps them in determining the efficacy of establishment of medicinal and aromatic plants and commercial extraction of products.
4.	It will allow them to develop the herbal products and health care system.
5.	They will be in a position to optimize the production of resources for design of products and formulations.
6.	It will help them in developing leadership quality to face challenges coming from health care systems.
7.	They can develop the ability to understand global/local regulatory issues and adapt to the changes.
8.	It will be useful for them to develop innovative experimental methods and products.
9.	They can demonstrate leadership in research planning.
10.	They will be able to understand professional, ethical, legal and social issues and responsibilities.

Programme Specific Outcomes (PSOs) of M.Sc. Medicinal and Aromatic Plants	
1.	The students will develop basic, comparative and applied knowledge and skills relating to medicinal and aromatic plant resources.
2.	They can find application of modern tools and techniques for integration of biotechnology with health care systems.
3.	They will be able to render service to the society as an entrepreneur.
4.	It will make them capable of pursuing higher studies and getting employment.

Mapping of Program Educational Objectives (PEOs) Vs. Program Outcomes (POs)

	PO_A	PO_B	PO_C	PO_D	PO_E	PO_F	PO_G	PO_H	PO_I	PO_J	PO_K
PEO1	√	√	√	√	√	√	√				
PEO2							√		√		√
PEO3							√	√	√	√	√
PEO4	√	√	√	√	√	√	√	√			
PEO5			√			√	√	√	√	√	
PO6								√	√	√	√

SEMESTER SYSTEM

The course comprises four semesters. One Semester = 15 weeks. Theory 1 Credit = 1hr/week. Practical 2 credit = 3hrs/week. Theory paper carries 100 marks and practical paper carries 100 marks each (Students seminar 100 marks and Project work of 100 marks will be evaluated in IV Semester). Total Credit is 90 (Ninety).

COURSE STRUCTURE

Semester –I

MAP 1.1	Medicinal and aromatic plants resources	(40 Lectures / 4 Credits)
MAP 1.2	General Botany	(40 Lectures / 4 Credits)
MAP 1.3	Ecology Concepts	(40 Lectures / 4 Credits)
MAP 1.4	Research methodology	(40 Lectures / 4 Credits)
MAP 1.5	Practicals	(50 Classes / 8 Credits)

Semester –II

MAP 2.1	Ethno Biology	(40 Lectures / 4 Credits)
MAP 2.2	Pharmacognosy	(40 Lectures / 4 Credits)
MAP 2.3	Genetics & Genetic Resource Management	(40 Lectures / 4 Credits)
MAP 2.4	Biochemistry & Phytochemistry	(40 Lectures / 4 Credits)
MAP 2.5	Practicals	(50 Classes / 8 Credits)

Semester-III

MAP 3.1	Quality control, monitoring & regulation of herbal products	(40 Lectures / 4 Credits)
MAP 3.2	Biodiversity conservation & Sustainable utilization	(40 Lectures / 4 Credits)
MAP 3.3	Intellectual property right in respect of biological resources	(40 Lectures / 4 Credits)
MAP 3.4	Plant Biotechnology	(40 Lectures / 4 Credits)
MAP 3.5	Practicals	(50 Classes / 8 Credits)

Semester-IV

MAP 4.1	Seminar Presentation	(2 Credits)
MAP 4.2	Project	(16 Credits)

SEMESTER-I

MAP 1.1 MEDICINAL AND AROMATIC PLANTS RESOURCES CREDITS: 4

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 1.1 Medicinal and Aromatic Plant Resources	CO1	It will enable the students to develop the skill of isolation, authenticate and processing of crude drugs from different classes of plant groups.	1,2,3,4 /1,2,3,4	1,2,3
	CO2	Students can pursue large scale production of crude drugs matching with the mandates of different Indian systems of medicine.	2,3,4 /3,4	1,2,3

MAP 1.2 GENERAL BOTANY CREDITS: 4

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 1.2 General Botany	CO1	It will enable the students eradicate the ambiguity regarding plant identification.	1,2,5 / 1,3	1,2,3
	CO2	Students can understand the stress induced anomalies and find out solutions in plants so as to design environmentally resilient plants.	2,3,5 / 1,3	2,3

MAP 1.3 ECOLOGY CONCEPTS CREDITS: 4

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 1.3 Ecology Concepts	CO1	Students will be able to understand the concepts and problems relating to environment at different trophic level.	3,5 / 1,3	1,2
	CO2	It will enable the students to find the possibilities of sustainable conservation.	2,3,5 / 1,3	2,3

MAP 1.4 RESEARCH METHODOLOGY **CREDITS: 4**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 1.4 Research Methodology	CO1	Students will be able to find out the statistical relevance of the experiments undertaken.	3,5 / 1,2,3,4	1,2
	CO2	It will enable the students to check if the outcome of the research is provable against the hypothesis and can be interpreted for understanding of larger mass.	3,5 / 1,2,3,4	2,3

MAP 1.5 PRACTICALS **CREDITS: 8**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 1.5 Practicals	CO1	Students will be able to learn the techniques on in vitro mass multiplication.	2,3 / 1,2,3,4	1,3
	CO2	They can venture in commercial scale production unit for important plants where conventional methods are a problem.	2,3,5 / 1,2,3,4	2,3

SEMESTER-II

MAP 2.1 ETHNO BIOLOGY **CREDITS: 4**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 2.1 Ethno Biology	CO1	It will enable the students to record, translate and validate the traditional information into usable avenues.	2,3,5 / 1,3,4	1,2,3
	CO2	Students will be able to find out the health care solutions specific to disease in a precise manner.	2,3,5 / 1,3,4	2,3

MAP 2.2 PHARMACOGNOSY **CREDITS: 4**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 2.2 Pharmacognosy	CO1	This will help students in validating the existing treatments options for different diseases and formulate new drugs.	2,4,5 / 1,2,3,4	2,3,4,5
	CO2	The students will be able to assess and relate the information with the national and international market for crude drugs.	3,4 / 1,3	2,3

MAP 2.3 GENETICS & GENETIC RESOURCE MANAGEMENT **CREDITS: 4**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 2.3 Genetics &Genetic Resource Management	CO1	Identify and present relevant information related to issues of germplasm origin and right to protect.	3 / 1,3	2,3
	CO2	The students will be able to assess and relate how important genetic resources can be maintained.	2,3 / 1,2,3,4	2,3
	CO3	They can develop strategies to identify, conserve and use the genetic resources properly abiding the rules and regulations.	2,3,5 / 1,2,3,4	3,4,5

MAP 2.4 BIOCHEMISTRY AND PHYTOCHEMISTRY **CREDITS: 4**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 2.4 Biochemistry and Phytochemistry	CO1	Students will be able to understand the structure and functions of biomolecules like carbohydrates, amino acids, proteins, lipids and nucleic acids.	4,5 / 1,3,4	2
	CO2	It will enable the students to explore the role of kinetics and inhibition of several metabolic pathways and their implications in cellular process.	5 / 1,3,4	2,3,4,5
	CO3	It gives an insight into identify, isolate and characterize specific metabolites responsible for its inherent function.	1,3,4 / 1,2,4	2,3,4,5

MAP 2.5 PRACTICALS **CREDITS: 8**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 2.5 Practicals	CO1	This will help student to comprehensively isolate active components using different methods from plant extracts.	1,3 / 2,3,4	2,3
	CO2	Students will be able to industrialize in relevance to health, food and cosmetic industries to design a product or formulation.	2,3,4,5 / 2,3,4	3,4,5

SEMESTER-III

MAP 3.1 QUALITY CONTROL, MONITORING & REGULATION OF HERBAL PRODUCTS **CREDITS: 4**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 3.1 Quality control, Monitoring & Regulation of Herbal products	CO1	Students will be able to understand the concepts and problems relating to herbal products.	3,4,5 / 1,3,4	2,3,4,5
	CO2	It will enable the students to gain knowledge on nutraceuticals and explore the possibilities of preparing the herbal products.	3,4,5 / 1,3,4	1,2,3,4,5

MAP 3.2 BIODIVERSITY CONSERVATION & SUSTAINABLE UTILIZATION

CREDITS: 4

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 3.2 Biodiversity Conservation & Sustainable Utilization	CO1	Students will be able to understand the concepts and problems relating to the ecosystem.	3 / 1,3,4	2,3,4,5
	CO2	It will help the students to apply the knowledge gained during the study on conservation of plants.	2,3 / 1,3,4	3,4,5

MAP 3.3 INTELLECTUAL PROPERTY RIGHT IN RESPECT OF BIOLOGICAL RESOURCES **CREDITS: 4**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 3.3 Intellectual Property Right in respect of Biological Resources	CO1	Students will be able to understand the concept of commercialization, some information about patents and trademarks.	2,3,4,8 / 1,3,4	2,3,4,5
	CO2	It will also enable students to explore the interpretation of biological databases protection.	3,8 / 2,3,4	3,4,5

MAP 3.4 PLANT BIOTECHNOLOGY **CREDITS: 4**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 3.4 Plant Biotechnology	CO1	This will make students to know the techniques of plant tissue culture used for plant breeding.	2,3,5 / 2,3,4	2,3,4,5
	CO2	This will make students to apply the method of somatic embryogenesis, protoplast culture and germplasm conservation.	3,5 / 2,3,4	3,4,5
	CO3	This will enable the students to produce plant secondary metabolites through tissue culture method.	2,4,5 / 2,3,4	3,4,5

MAP 3.5 PRACTICALS **CREDITS: 8**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 3.5 Practicals	CO1	Application of skills based on tissue culture to secure job in tissue culture, food and pharmaceutical industries.	2,3,4 / 2,3,4	3,4,5

SEMESTER IV

MAP 4.1 SEMINAR PRESENTATION **CREDITS: 2**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 4.1 Seminar Presentation	CO1	Development and exploration of knowledge base to attain objectives in the realm of science and technology.	6,7,8,9,10 / 1,2,3,4	3,4,5

MAP 4.2 PROJECT WORK **CREDITS: 16**

COURSE	CO	Course Outcome's	PO / PSO	BTL
MAP 4.2 Project Work	CO1	Application and analysis of scientific thoughts and perceptions for refinement of processes and to develop new products.	6,8,9,10 / 1,2,3,4	3,4,5

* * * * *