MUGBERIA GANGADHAR MAHAVIDYALAYA
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NAAC Re-Accredited B+Level Govt. aided College
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PROGRAMME OUTCOME (PO), COURSE OUTCOME (CO) AND PROGRAMME SPECIFIC OUTCOME (PSO) FOR END EXAMINATION STUDENTS UNDER GRADUATE COURSE: 2020

Programme Name: B.Sc. (BOTANY)

PO 1.	**Relevance of the Principles:** To understand the basic laws of nature, fundamental principles, and the scientific theories related to various phenomena and their relevance in the day-to-day life
PO 2	**Critical Thinking, Problem Solving Skills:** Acquire the skills in handling scientific instruments, planning and performing in laboratory experiments. The skills of observations and drawing logical inferences from the scientific experiments.
PO 3.	**Develop Interdisciplinary Knowledge:** Realizing that knowledge of subjects in other branches such as humanities, performing arts, social sciences etc. can have greater influence and inspiration in evolving new scientific theories and inventions, and understanding the importance of interdisciplinary study in every walk of life
PO 4	**Moral and Ethical Values:** To imbibe ethical, moral and social values in personal and social life leading to highly cultured, civilized and responsible personality development.
PO 5	**Experimental learning and Employability options:** Analyzing the given scientific data critically and systematically and the ability to draw the objective conclusions. Acquire the knowledge with facts and figures related to various subjects in pure sciences such as Botany, Chemistry, Computer Science, Electronics, Mathematics, Physics, and Zoology etc.
PO 6	**Develop Research Related Skill:**Create, select, and apply appropriate techniques, resources, and modern instruments and equipments for Biochemical estimation, Molecular Biology, Biotechnology, Plant Tissue culture experiments, cellular and physiological activities of plants with an understanding of the application and limitations.
PO 7	**Communication skill and attitudes:** 1. Use of IT (word-processing, use of internet, statistical packages and databases). 2. Communication of scientific ideas in writing and orally. 3. Ability to work as part of a team. 4. Ability to use library resources. 5. Time management. 6. Career planning.

PROGRAMME SPECIFIC OUTCOME:

PSO 1: Procure updated and quality knowledge in the specialized areas of Botany.

PS0 2: Acquire practical skills in plant diversity and related topics

PS0 3: Identify plants applying classical and modern taxonomical skills.

PS0 4: Evolve entrepreneurial skills related to advanced fields of Botany.

PS0 5: Equip with various computational skills applied in the field of Bioinformatics.

PS0 6: Gain knowledge in organization of plants at gene, molecular, cellular and tissue level.

PSO7: Design and carryout biological experiments, projects and interpret data providing meaningful solutions

PS0 8: Beware of environmental issues and live-in harmony with nature.

PSO 9: Students able to start nursery, mushroom cultivation, biofertilizer production, fruit preservation and horticultural practices.

PSO 10: To know advance techniques in plant sciences like tissue culture, Phytoremediation, plant disease management, formulation of new herbal drugs .

Course Outcomes (CO)

CO/Course Code	Course Name	Course Outcome
CO1 PART-I Section - I	Bacteria, Viruses, Algae, Fungi and Plant Pathology	1. Identify various algae , bacteria and fungi. 2. Understand the economic uses of algae, bacteria and fungi 3. Understand the structure and life cycle of different group of alge, bacteria and fungi. 4. Classify different fungi based on morphology and reproduction, differentiate different lichens
CO2 Section – II	Bryophyte, Pteridophyte, Gymnosperm and	1. Classify various bryophytes and understand their

	Paleobotany	economic uses 2. The knowledge of origin, classification, stelar evolution and economic importance of Pteridophytes 3. The understanding of structure, reproduction and evolution of Pteridophytic order 4. Understand classification, general characters, distribution and phylogeny, economic importance of Gymnosperms. 5. Critically differentiate the characters of four orders of Gymnosperm i.e., Cycadales, Coniferales, Ginkgoales and Gnetales 6. Understand the major systems of classification

CO3 Section – III	Morphology and Embryology, Taxonomy of Angiosperms, Economic Botany –	1. Learn the botanical nomenclature, BSI and herbarium preparation 2. Understand the phylogeny of angiosperms and taxonomical evidence 3. Learn the diagnostic characters, economic importance, systematic and phylogeny of certain families
CO4 PART -II Section – I	Anatomy, Ecology, Ethnobotany	1. Understand various internal structures of the plant. 2. Secondary growth in plants 3. Compare different types of embryo and endosperm development 4. Analyze various types of ecosystems and correlate different ecosystems. 5. Know about how

		changes take place during ecological succession. 6. Understand the water relations, absorption of water & minerals; stress mechanism 7. Learn the photosynthesis and respiration;
CO5 Section – II	Cell Biology, Genetics	1. Know about mutagens 2. Understand DNA as the basis of heredity and variation 3. Understand the ultra structure and functioning of cell in the sub-microscopic and molecular level.
CO6 Section – III	Plant Physiology and Biochemistry	1. Compare the C3, C4 and CAM cycles 2. Understand the mechanisms of nitrogen fixation 3. Learn the applications of growth regulators and their role in plant physiological

		activities 4. Understand the concepts of thermodynamics and photobiology
CO7 PART-III Section - I	Genetics, Plant Breeding and Biometry	1. Appreciate the facts behind heredity and variations. 2. Understand the basic principles of inheritance. 3. Solve problems related to classical genetics. 4. Predict the pattern of inheritance. 5. Understand various plant breeding techniques. 6. Realize the role of plant breeding in increasing crop productivity.
CO8 Section - II	Medicinal Plants, Floriculture, Plant protection, Plant propagation	1. Critically evaluate the advantages of tissue culture and horticulture over conventional methods

		of propagation. 2. Apply various plant propagation practices in the field. 3. Experiment on the subject and try to become entrepreneurs. 4. Identify the ornamental plant
CO9 Section-III	Mushroom culture, Biofertilizer	1. Learn Cultivation technique of mushrooms 2. Critically evaluate the advantages of organic farming. 3. Apply various biofertilizers in the field. 4. Experiment on the subject and try to become entrepreneurs
CO10 Section - IV	Seed preservation, Biodiversity	1. Methods of conservation 2. Know name of threatened plants 3. Learn about modern techniques of seed storage

PROGRAMME SPECIFIC OUTCOMES FOR BOTANY STUDENTS (PSO)

UG programme in Science enables the students to grow and nurture a cultural taste, a sense of scientific approch, make them politically aware and responsible citizens and live with dignity in a plural society. It also upgrades the students to acclimatize themselves to the changing socio-cultural and political scenarios and develop the skills necessary to seek employment in the liberal economic world. The programme outcome is as follows.

Analytical Skills: Our students, studying a combination of subjects offered by the institution develop a scientific attitude. The practical programme helps make our students aware of our environment.

Employability: After completing the degree, our students will be employable in the fields of education, tourism and various other industries. The programme emphasizes developing reading, writing and comprehension skills which make the students fit and eligible for jobs in the government and nongovernment sectors. A broad-spectrum study of various subjects helps the students to compete in various examinations for employment after graduation.

Values: Scientific aptitudes inculcate values that give direction to society. Our students are highly aware of environment, hygiene, and other aspects of social responsibility.

PO and CO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	average
CO1	3	1	2	1	2	2	1	1.71
CO2	3	3	3	3	2	2	1	2.43
CO3	3	3	3	3	2	3	1	2.57
CO4	3	3	3	3	2	3	1	2.57
CO5	3	3	3	3	2	3	1	2.57
CO6	3	3	3	3	2	3	1	2.57
CO7	3	3	3	3	2	3	1	2.57
CO8	3	3	3	3	2	3	1	2.57
CO9	3	3	3	3	2	3	1	2.57
CO10	3	3	3	3	2	3	1	2.57

Mapping Correlation

3	2	1
High	**Medium**	**Low**

Attainment of Course Outcomes & Programme Outcomes

In the Outcome Based Education (OBE), assessment is done through one or more than one processes, carried out by the department, that identify, collect, and prepare data to evaluate the achievement of course outcomes (CO's).

The process for finding the attainment of Course outcomes uses various tools/methods. These methods are classified into two types: **Direct and Indirect methods.**

Direct methods display the student's knowledge and skills from their performance in the class/assignment test, internal assessment tests, assignments, semester examinations, seminars, projects, etc. These methods provide a sampling of what students know and/or can do and provide strong evidence of student learning.

Indirect methods such as course exit survey and examiner feedback to reflect on student's learning. They are used to assess opinions or thoughts about the graduate's knowledge or skills.

Following tables show the various methods used in assessment process that periodically documents and demonstrates the degree to which the Course Outcomes are attained. They include information on:

a) Listing and description of the assessment processes used to gather the data.
b) The frequency with which these assessment processes are carried out.

Table 1 : Direct Assessment tool used for CO attainment			
Sr. No.	**Direct Assessment Method**	**Assessment frequency**	**Description**
1.	Internal Assessment Test	Twice in a year	The Internal Assessment marks in a theory paper shall be based on two tests generally conducted in the month of September and December of each year. It is a metric used to continuously assess the attainment of course outcomes w.r.t course objectives. Average marks of two tests shall be the Internal Assessment Marks for the relevant course

2.	Lab Assignments / experiments	Once in a week	Lab Assignment/Experiment is a qualitative performance assessment tool designed to assess students' practical knowledge and problem solving skills. Minimum ten experiments need to be conducted for every lab course.
3.	End yearly Examination	Once in a year	Annual examination (theory or practical) are the metric to assess whether all the course outcomes are attained or not framed by the course in charge. End yearly Examination is more focused on attainment of all course outcomes and uses a analytical questions.
4 .	Home Assignments	Twice in a Year	Assignment is a metric used to assess student's analytical and problem solving abilities. Every student is assigned with course related tasks & assessment will be done based on their performance. Grades are assigned depending on their innovation in solving/deriving the problems.
5.	Class / Assignment Test	Twice in a year	It is a metric used to continuously assess the student understands capabilities.
6.	Presentations	As per the requirement	Presentation is the metric used to assess student's communication and presentation skills along with depth of the subject knowledge. Seminars topics are given to the students that cover topics of current interest or provide in-depth coverage of selected topics from the core courses.

Table 2: Indirect Assessment tool used for CO attainment

Sr. No.	**Indirect Assessment Method**	**Assessment frequency**	**Method Description**
1	Course Exit Survey / Students Feedback Survey	End of Annual exam.	Collect variety of information about course outcomes from the students after learning entire course.

The weightages given for various assessment tools used for the attainment of Course Outcomes are shown in table 3.

Table 3: List of Course Assessment tools

			Tools	**Frequency**	**Weightage**
Assessment Tools	**Direct**	**Internal Tools**	Internal Assessment	Twice in a year	10/100
			Home Assignments	Twice in a Year.	
			Mock Test or Surprise Test	Once in a year	
			MCQ		
			Seminar/Presentations		
		External Tools	End annual Examination	Once in a year	**90/100(Theory paper), 100/100(Practical Paper)**

DIRECT METHOD

Academic Session: 2019-2020

Semester VI

Programme Name: B.Sc.General (Botany)

ATTAINMENT LEVELS FOR

Target Level	**Level Description/ Marks student scoring**	
1	Below 40%	50 → indicates % and above in the questions in Internal and External tests
2	Below 40%-49%	
3	50% & about	

Botany Outgoing Students -2020

slno	Year of passing	B.Sc. Bio GENERAL	Enrollment No.	Mark Obtained	Result
1.	2020	ABHIJIT JANA	32218129 / 1001	738	II
2.	2020	AGNIPRABHA GHORAI	1002	1002	I
3.	2020	BISWAS GIRI	1004	972	I
4.	2020	DEBASRI JANA	1005	990	I
5.	2020	DEBISMITA BERA	1006	883	I
6.	2020	MADHUMITA SASMAL	1009	910	I
7.	2020	PABITRA GIRI	1011	829	II
8.	2020	POULAMI PATRA	1013	992	I
9.	2020	RITU ROY	1017	918	I
10.	2020	SAYANIKA RANA	1021	811	I
11.	2020	SOMA PRADHAN	1022	1012	I
12.	2020	SUMAN BERA	1025	1060	I
13.	2020	TANUSHRI GIRI	1029	895	I
14.	2020	SHILPA PANDA	1040	916	I
15.	2020	UTTAM KUMAR BERA	1047	873	I
16.	2020	PUSPITA MAITY	1048	777	II
17.	2020	NILANJANA SAHU	32217129 / 1001	850	I

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Principal
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