Dyal Singh College, Karnal

Name of the Programme: Bachelor of Science (Medical), Subject: Botany

Duration: Three years

PROGRAMME OUTCOMES (POs)		
PO1	Knowledge	Enables the students in gaining knowledge and to study in a holistic manner.
PO2	Communication	Ability to effectively communicate their views and present their work with confidence to the scientific community and society
PO3	Problem Solving	Enables the student to apply the knowledge gained to study plants in a holistic manner and to solve scientific problems in a directional way
PO4	Individual and Team Work	Capable to learn and work as an individual or team in an effective manner.
PO5	Investigation of Problems	Develop skill to critically think and analyse the knowledge of subject in interpretation of data and addressing practical problems.
PO6	Modern Tool Usage	Capable of learning advanced scientific techniques and tools used in learning plant biology.
PO7	Science and Society	Ability to apply theoretical and practical knowledge to resolve issues related to the society.
PO8	Life-Long Learning	Capable in applying fundamental concepts, principle and processes of botany that are required in learning activities throughout life.
PO9	Environment and Sustainability	Ability to adopt knowledge in plant structure, function and solve the issues related to environment and ecology in a sustainable manner.
PO10	Ethics	Apply moral and ethical principles in both academics and research to become professionally more responsible citizen
PO11	Project Management	Ability to apply knowledge in understanding, designing and managing novel projects related to plant biology

PROGRAMME SPECIFIC OUTCOMES (PSOs)	
The objective of the curriculum designed for B.Sc Med. course is to nurture the fundamental knowledge and modern concepts of biology in students for developing professional competency to work in institutions and pharmaceutical, biotechnological, healthcare industries.	
PSO1	To develop proficiency for identifying the various plants and compare the characters of lower and higher groups of plants. This comparative approach will help them to explain the evolution and degree of genetic diversity inplants.
PSO2	This course content is targeted to explain the various biological processes in plants and how they occur at the cellular and molecular levels. Students will also be able to understand the ecology, morphology, anatomy and development of different forms oflife.
PSO3	Exposure to various experimental techniques and methods in various fields of plantsciences.
PSO4	The structure of course curriculum is aimed to inculcate minimum standards of communication skills expected from a Botany graduate in the country. They will also acquire critical thinking abilities that will enhance their problem-solving capabilities.
PSO5	Encourage students in finding career opportunities in higher education in the field of plant sciences and other entrepreneurshipprogrammes. They will also learn team work in order to serve the Government sector institutions or industry and society.

B-BOT-101: Diversity of Microbes

Course Objective: The aim of this course is to introduce students to the world of basic botany that include primary diversity of living systems.

Course Outcomes: At the end of the course students will be able to

B-BOT-101.1 Learn andunderstand the general characters, economic importance and life-cycle of different groups of microbes, algae and fungi.

B-BOT-101.2 students will be able to explain their impact on environment, human welfare and role in different industries.

B-BOT-101.3 students will understand the evolutionary significance and lineage of these organisms

CO-PO Mapping Matrix for Course Code: B-BOT-101

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-101.1	3	2	2	1	3	2	2	3	3	1	2
B-BOT-101.2	3	2	3	2	1	2	1	2	3	1	3
B-BOT-101.3	3	1	1	1	2	1	1	2	1	1	1
Avera ge	3	1.6	2	1.3	2	1.6	1.3	2.3	2.3	1	2

CO-PSO Mapping Matrix for Course Code: B-BOT-101

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-101.1	3	3	1	1	2
B-BOT-101.2	3	3	2	2	3
B-BOT-101.3	3	2	1	2	1
Average	3	2.6	1.3	1.6	2

B-BOT-102: CELL BIOLOGY

Course Objective: Aim ofthis course is to make students aware of structure and functions of a cell

Course Outcomes: At the end of the course students will be able to

B-BOT-102.1 Understand structure and composition of cell wall and cell membrane

B-BOT-102.2 Know the significance of cell organelles

B-BOT-102.3 Explain the structure of chromosomes and acknowledge various chromosomal abnormalities

CO-PO Mapping Matrix for Course Code: B-BOT-102

Cos	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-102.1	3	2	2	3	2	2	3	3	2	1	1
B-BOT-102.2	2	3	2	2	3	1	2	3	2	2	1
B-BOT-102.3	3	2	1	3	2	2	1	2	1	2	2
Average	2.6	2.3	1.6	2.6	2.3	1.6	2.0	2.6	1.6	1.6	1.3

CO-PSO Mapping Matrix for Course Code: B-BOT-102

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-102.1	2	2	1	2	3
B-BOT-102.2	2	1	3	2	2
B-BOT-102.3	3	2	2	1	1
Average	2.3	1.6	2.0	1.6	2.0

B-BOT-201: Diversity of Archegoniates

Course Objective: The aim of this course is to introduce students to the world of basic botany that include primary diversity of living systems.

Course Outcomes: At the end of the course students will be able to

B-BOT-201.1 learn andunderstand the general characters, economic importance and life-cycle of different groups of bryophytes and pteridophytes.

B-BOT-201.2 students will be able to explain their impact on environment, human welfare and role in different industries.

B-BOT-201.3 students will understand the evolutionary significance and lineage of these organisms

CO-PO Mapping Matrix for Course Code: B-BOT-201

Cos	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-201.1	3	2	2	1	3	2	2	3	3	1	2
B-BOT-201.2	3	2	3	2	1	2	1	2	3	1	3
B-BOT-201.3	3	1	1	1	2	1	1	2	1	1	1
Avera ge	3	1.6 7	2	1.3 3	2	1.6 7	1.3 3	2.3 3	2.3 3	1	2

CO-PSO Mapping Matrix for Course Code: B-BOT-201

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-201.1	3	3	1	1	2
B-BOT-201.2	3	3	2	2	3
B-BOT-201.3	3	2	1	2	1
Average	3	2.67	1.33	1.67	2

B-BOT-202: GENETICS

Course Objective: This course make student aware of genetic material

Course Outcomes: At the end of the course students will be able to

B-BOT-202.1 Explain the laws of inheritance and structure and functions of DNA and RNA

B-BOT-202.2 Know the properties of DNA and RNA and mutational effects

B-BOT-202.3 Understand Transcription, Translation and Gene regulation

CO-PO Mapping Matrix for Course Code: B-BOT-202

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-202.1	2	3	2	2	3	1	2	3	2	1	1
B-BOT-202.2	3	2	2	3	2	2	1	3	1	2	1
B-BOT-202.3	2	3	3	2	2	1	2	2	1	1	1
Average	2.3	2.6	2.3	2.3	2.3	1.3	1.6	2.6	1.3	1.3	1.0

CO-PSO Mapping Matrix for Course Code: B-BOT-202

COs	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-202.1	3	2	2	1	2
B-BOT-202.2	2	3	1	2	2
B-BOT-202.3	2	3	2	2	1
Average	2.3	2.6	1.6	1.6	1.6

B-BOT-203: Diversity of Microbes, Diversity of Archegoniates, Cell biology and Genetics Practical

Course Objective: The aim of this course is to introduce students to the world of practical knowledge of primary diversity of living systems.

Course Outcomes: At the end of the course students will be able to

B-BOT-203.1 learn andunderstand to identify, classify and study morphology of different groups of microbes, algae, fungi, bryophytes and pteridophytes.

B-BOT-203.2 students will be able to explain different stages of cellular biology and will understand genetic diversity in organisms

B-BOT-203.3 students will collect specimen of diverse forms of organisms from their neighboring areas and will be able to make projects either individually or in groups.

CO-PO Mapping Matrix for Course Code: B-BOT-203

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-203.1	3	3	2	1	3	3	2	1	2	1	1
B-BOT-203.2	3	2	3	1	3	3	2	2	2	1	1
B-BOT-203.3	3	3	2	3	3	2	3	3	2	3	3
Average	3	2.67	2.33	1.67	3	2.67	2.33	2	2	1.67	1.67

CO-PSO Mapping Matrix for Course Code: B-BOT-203

COs	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-203.1	3	1	3	1	2
B-BOT-203.2	1	3	3	1	2
B-BOT-203.3	2	2	1	3	1
Average	2	2	2.33	1.67	1.67

B-BOT-301: BIOLOGY AND DIVERSITY OF SEED PLANTS-I

Course Objective: The aim of this course is to introduce students to the world of basic botany that include primary diversity of seed plants.

Course Outcomes: At the end of the course students will be able to

B-BOT-301.1 learn andunderstand the general characters, economic importance and life-cycle of gymnosperms

B-BOT-301.2 students will be able to explain their impact on environment, human welfare and role in different industries.

B-BOT-301.3 students will understand the evolutionary significance and lineage of these seed plants

CO-PO Mapping Matrix for Course Code: B-BOT-301

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-301.1	3	2	2	1	3	2	2	3	3	1	2
B-BOT-301.2	3	2	3	2	1	2	1	2	3	1	3
B-BOT-301.3	3	1	1	1	2	1	1	2	1	1	1
Avera ge	3	1.6 7	2	1.3 3	2	1.6 7	1.3 3	2.3 3	2.3 3	1	2

CO-PSO Mapping Matrix for Course Code: B-BOT-301

COs	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-301.1	3	3	1	1	2
B-BOT-301.2	3	3	2	2	3
B-BOT-301.3	3	2	1	2	1
Average	3	2.67	1.33	1.67	2

B-BOT-302: PLANT ANATOMY

Course Objective: The aim of this course is to introduce students to internal organization of plants which is very important in plant biology

Course Outcomes: At the end of the course students will be able to

B-BOT-302.1 identify, describe and differentiate plant cells, cell organelles and their functions which is helpful in botany

B-BOT-302.2 students will be able to apply plant anatomical features for correct identification and it will be useful in taxonomy

B-BOT-302.3 students will understand the wood structure in a better manner

CO-PO Mapping Matrix for Course Code: B-BOT-302

Cos	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-302.1	3	1	3	1	2	2	2	3	3	1	2
B-BOT-302.2	3	2	3	2	1	2	1	2	3	1	3
B-BOT-302.3	3	1	1	1	2	1	1	2	1	1	1
Avera ge	3	1.3 3	2.3 3	1.3 3	1.6 7	1.6 7	1.3 3	2.3 3	2.3 3	1	2

CO-PSO Mapping Matrix for Course Code: B-BOT-302

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-302.1	3	3	1	1	2
B-BOT-302.2	3	3	2	2	3
B-BOT-302.3	3	2	1	2	1
Average	3	2.67	1.33	1.67	2

B-BOT-401: BIOLOGY AND DIVERSITY OF SEED PLANTS-II

Course Objective: The aim of this course is to introduce students to the different concepts of plant taxonomy that icludes naming, classification and basic knowledge about flowering plants

Course Outcomes: At the end of the course students will be able to

B-BOT-401.1 learn andunderstand the botanical description of plants, nomenclature and terms related to their identification

B-BOT-401.2 discuss the importance of plant taxonomy and taxonomic hierarchy and will understand the Bentham and Hooker classification system

B-BOT-401.3 students will understand the concepts of numerical taxonomy

CO-PO Mapping Matrix for Course Code: B-BOT-401

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-401.1	3	2	1	2	3	1	2	3	2	1	2
B-BOT-401.2	3	2	3	1	2	1	1	3	1	1	1
B-BOT-401.3	3	2	3	3	3	3	3	2	2	3	2
Average	3	2	2.33	2	2.67	1.67	2	2.67	1.67	1.67	1.67

CO-PSO Mapping Matrix for Course Code: B-BOT-401

COs	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-401.1	3	1	3	2	2
B-BOT-401.2	3	2	1	1	2
B-BOT-401.3	3	2	3	2	2
Average	3	1.67	2.33	1.67	2

B-BOT-402: PLANT EMBRYOLOGY

Course Objective: The aim of this course is to introduce students to the embryological studies that play important role in plant breeding and crop improvements.

Course Outcomes: At the end of the course students will be able to

B-BOT-402.1 explain the developmental patterns of both vegetative and reproductive organs of plants

B-BOT-402.2 apply knowledge about embryological characters in explaining plant reproductive biology

CO-PO Mapping Matrix for Course Code: B-BOT-402

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-402.1	3	1	2	1	1	1	2	2	2	1	1
B-BOT-402.2	3	2	2	1	1	1	2	2	2	1	1
Avera ge	3	1.5	2	1	1	1	2	2	2	1	1

CO-PSO Mapping Matrix for Course Code: B-BOT-402

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-402.1	3	2	2	2	1
B-BOT-402.2	3	2	2	2	2
Average	3	2	2	2	1.5

B-BOT-403: Biology and diversity of seed plants-I, II, plant taxonomy & plant embryology Practical

Course Objective: The aim of this course is to introduce students to the world of seed plants, taxonomy and embryology

Course Outcomes: At the end of the course students will be able to

B-BOT-403.1 learn andunderstand the morphology, anatomy, reproductive biology of seed plants

B-BOT-403.2 students will be able to explain important characters and describe flowers in technical terms

B-BOT-403.3 students will understand the embryology of plants

CO-PO Mapping Matrix for Course Code: B-BOT-403

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-403.1	3	3	2	1	3	3	2	1	2	1	1
B-BOT-403.2	3	2	3	1	3	3	2	2	2	1	1
B-BOT-403.3	3	3	2	3	3	2	3	3	2	3	3
Avera ge	3	2.6 7	2.3 3	1.6 7	3	2.6 7	2.3 3	2	2	1.67	1.67

CO-PSO Mapping Matrix for Course Code: B-BOT-403

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-403.1	3	1	3	1	2
B-BOT-403.2	1	3	3	1	2
B-BOT-403.3	2	2	1	3	1
Average	2	2	2.33	1.67	1.67

B-BOT-501: Plant Physiology

Course Objective: This course will makes students aware of various plant growth parameters

Course Outcomes: At the end of the course students will be able to

B-BOT-501.1 Understand plant – water relation and mineral requirements of plants

B-BOT-501.2 Detail of plant movement and photoperiodic responses

B-BOT-501.3 Acknowledge physiology of Photosynthesis and Respiration

CO-PO Mapping Matrix for Course Code: B-BOT-501

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-501.1	3	2	2	1	2	3	1	2	2	1	1
B-BOT-501.2	2	3	2	2	3	2	2	1	2	1	2
B-BOT-501.3	3	2	2	3	2	1	2	2	1	2	1
Average	2.6	2.3	2.0	2.0	2.3	2.0	1.6	1.6	1.6	1.3	1.3

CO-PSO Mapping Matrix for Course Code: B-BOT-501

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-501.1	3	2	2	1	2
B-BOT-501.2	2	3	2	2	1
B-BOT-501.3	2	3	2	2	1
Average	2.3	2.6	2.0	1.6	1.3

B-BOT-502: Ecology

Course Objective: This course provide importance of ecology for human development

Course Outcomes: At the end of the course students will be able to

B-BOT-502.1 Explain the introduction of ecology and importance of various environmental factors

B-BOT-502.2 Know about population growth and ecological adaptations

B-BOT-502.3 Study various types of pollution and phytogeographic zones of India

CO-PO Mapping Matrix for Course Code: B-BOT-502

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-502.1	2	3	2	2	1	2	3	2	1	1	2
B-BOT-502.2	3	2	1	2	1	3	1	2	2	1	1
B-BOT-502.3	2	3	2	2	2	3	2	2	1	2	1
Average	2.3	2.6	1.6	2.0	1.3	2.6	2.0	2.0	1.3	1.3	1.3

CO-PSO Mapping Matrix for Course Code: B-BOT-502

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-502.1	3	2	1	2	1
B-BOT-502.2	2	3	2	1	2
B-BOT-502.3	1	2	2	1	2
Average	2.0	2.3	1.6	1.3	1.6

B-BOT-601: Biochemistry and Plant Biotechnology

Course Objective: The aim of this course is to make Student aware of growth metabolism and plant tissue culture

Course Outcomes: At the end of the course students will be able to

B-BOT-601.1 Understand basics of enzymology

B-BOT-601.2 Explain the nitrogen and lipid metabolism

B-BOT-601.3 Understand gene cloning and different types of plant tissue culture

CO-PO Mapping Matrix for Course Code: B-BOT-601

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-601.1	3	1	2	2	3	2	3	2	2	2	2
B-BOT-601.2	2	3	2	3	3	1	2	3	2	1	2
B-BOT-601.3	3	2	2	3	2	2	3	2	1	2	2
Average	2.6	2.0	2.0	2.6	2.6	1.6	2.6	2.3	1.6	1.6	2.0

CO-PSO Mapping Matrix for Course Code: B-BOT-601

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-601.1	3	2	2	1	3
B-BOT-601.2	2	3	2	2	1
B-BOT-601.3	3	2	3	2	2
Average	2.6	2.3	2.3	1.6	2.0

B-BOT-602: Economic Botany

Course Objective: The aim of this course is to provide importance of economic plants

Course Outcomes: At the end of the course students will be able to

B-BOT-602.1 Explain description and importance of various types of plants

B-BOT-602.2 Know about various types of timber

B-BOT-602.3 Study cultivation of various important plants

CO-PO Mapping Matrix for Course Code: B-BOT-602

Cos	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-602.1	3	3	2	2	3	3	2	3	2	2	2
B-BOT-602.2	2	3	2	2	3	2	2	3	3	2	1
B-BOT-602.3	3	2	2	3	2	2	3	2	2	2	2
Average	2.6	2.6	2.0	2.3	2.6	2.3	2.3	2.6	2.3	2.0	1.6

CO-PSO Mapping Matrix for Course Code: B-BOT-602

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-602.1	3	2	3	2	2
B-BOT-602.2	2	3	2	2	3
B-BOT-602.3	3	3	2	3	2
Average	2.6	2.6	2.3	2.3	2.3

B-BOT-603: Plant Physiology I, Plant Biochemistry&Biotechnology, Ecology and Economic Botany Practical

Course Objective: The aim of this course is to introduce students to the world of physiology, ecology and environment

Course Outcomes: At the end of the course students will be able to

B-BOT-603.1 learn andunderstand the physiology, biochemistry and biotechnological roles of plants

B-BOT-603.2 students will be able to study ecology and its impact on environment

B-BOT-603.3 students will understand the role of plants in human welfare

CO-PO Mapping Matrix for Course Code: B-BOT-603

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-603.1	3	2	3	3	3	3	2	1	2	1	1
B-BOT-603.2	3	2	3	1	3	3	2	2	2	1	1
B-BOT-603.3	3	3	2	3	3	2	3	3	2	3	3
Average	3	2.33	2.67	2.33	3	2.67	2.33	2	2	1.67	1.67

CO-PSO Mapping Matrix for Course Code: B-BOT-603

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-603.1	3	1	3	1	2
B-BOT-603.2	1	3	3	1	2
B-BOT-603.3	2	2	1	3	1
Average	2	2	2.33	1.67	1.67

Principal
Dyal Singh College
KARNAL