Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
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વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
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–: પરિપત્ર :–

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન Botany વિષયનાં અભ્યાસક્રમ ચલાવતી તમામ કોલેજોનાં આચાર્યશ્રીઓને તથા ડિપાર્ટમેન્ટના વડાશ્રીને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવેલ NEP-2020 અંતર્ગત B.Sc. Botany Sem-4 નો Major, Minor, અને SEC નાં અભ્યાસક્રમ બોટની વિષયની અભ્યાસ સમિતિની તા.૦૨/૧૨/૨૦૨૪ની સભાનાં ઠરાવ ક્રમાંકઃ૪ અન્વયે મંજૂર કરી વિજ્ઞાન વિદ્યાશાખાને કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિજ્ઞાન વિદ્યાશાખા વતી વિજ્ઞાન વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણને એકેડેમિક કાઉન્સિલની તા.૦૧/૩/૨૦૨૪ની સભાનાં ઠરાવ ક્રમાંકઃ૧૦૪ અન્વયે માન. કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત માનનીય કુલપતિશ્રી ધ્વારા મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

ક્રમાંક : ઓથો./સાયન્સ/પરિપત્ર/૨૫૫૯૦/૨૦૨૪
તા.૦૨–૧૨–૨૦૨૪

કુલસચિવ

પ્રતિ,
૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન Botany અભ્યાસક્રમ ચલાવતી કોલેજોનાં આચાર્યશ્રીઓ.
..... આપશ્રીની કોલેજના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારૂ.
૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા.
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.
.....તરફ જાણ તેમજ અમલ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Course Coding Pattern for Three/Four Years UG Degree (Honours) Semester-IV

FRAMED ACCORDING TO NATIONAL EDUCATION POLICY (NEP) 2020

(Effective from DECEMBER 2024)

FOR

BOTANY

Course Coding Pattern for Three/Four Years UG Degree (Honours) Semester-IV

Semester	Major(MJ)		Minor(ME)		Multi disciplinary (MDC)	AEC	SEC	VAC	Internship	Total Credits
	Theory	Practical	Theory	Practical	T/(T+P)	-----	T/P/ (T+P)	-----	--------	-----
IV	2+2+4	2+2+0	2	2	-	2	2	2	--------	22

[**AEC:** Ability Enhancement Course; **SEC:** Skill Enhancement Course; **VAC:** Value Added Course]

Semester IV[Major (BO-MJ)]

Course Code	Course Title	Teaching Schedule Hours /Week	Credits
BO-MJ-401	PHYTOTOMY	2	2
BO-MJ-402	PLANT PHYSIOLOGY	2	2
BO-MJ-403	PLANT BIOGEOGRAPHY	4	4
TOTAL CREDITS			8

Semester IV[Major (BOP-MJ)]

Course Code	Course Title	Teaching Schedule Hours /Week	Credits
BOP-MJ-VII	PRACTICAL	4	2
BOP-MJ-VIII	PRACTICAL	4	2
TOTAL CREDITS			4

Semester IV [Minor (ME)] DOMAIN SPECIFIC/ ELECTIVE

Course Code	Course Title	Teaching Schedule Hours /Week	Credits
BO-ME-401	LOWER CRYPTOGAMS	2	2
BOP-ME-402	PRACTICAL BASED ON BO-ME-401: ALGAE, FUNGI AND ANGIOSPERMS	4	2
TOTAL CREDITS			4

Semester IV[Skill Enhancement Course SEC)]

Course Code	Course Title	Teaching Schedule Hours /Week	Credits
BO-SEC-401	BONSAI TECHNIQUE	1	1
BOP – SEC - 402	PRACTICAL	2	1
TOTAL CREDITS			2

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

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BO-MJ-401

BOTANY (Major) PAPER – 401

BO-MJ-–401 **PHYTOTOMY** **(2 credits)**

BO-MJ-401	PHYTOTOMY	30 hours
UNIT 1	Tissue System & Nodal Anatomy	15 Hours
	➢ Dermal Tissue System ➢ Secretory Tissue System ➢ Leaf anatomy: Dicot and Monocot ➢ Vascular Cambium - General development & Structure of Vascular Cambium - Types of Cambium - Seasonal activity of Cambium ➢ Root –Stem transition ➢ Leaf abscission ➢ Nodal Anatomy	
UNIT 2	Secondary Growth in Vascular plants	15 Hours
	➢ Normal Secondary growth ➢ Normal Secondary growth in Dicot - Root - Stem ➢ Normal Secondary growth in Monocot - Root - Stem ➢ Anamolous Secondary growth ➢ Anamolous Secondary growth in Stem: - Boerhaavia, Nyctanthes, Bignonia, Dracaena ➢ Anamolous Secondary growth in Root: - Radish, Beet, Carrot	

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- Singh, V., Pande, P.C. and Jain, D.K. 2012, Structure Development and Reproduction in Angiosperms. Rastogi Publications, Meerut.

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BO-MJ-402
BOTANY (Major) PAPER – 402

BO-MJ--402 **PLANT PHYSIOLOGY** **(2 credits)**

BO-MJ-=402	PLANT PHYSIOLOGY	30 hours
UNIT 1	Plant Physiology - I	15 Hours
	Plant Movements ➢ Tropic Movements, Tactic Movements and Nastic Movements – Definition and Types Transpiration ➢ Definition, Types, Factors Affecting Transpiration, and Significance of Transpiration ➢ Types and Structure of Stomata ➢ Opening and closing of Stomata ➢ Mechanism of stomatal transpiration & Transpirational pull	
UNIT 2	Plant Physiology - II	15 Hours
	Photosynthesis ➢ Definition, Factors Affecting Photosynthesis ➢ Light Phase with photolysis of water with reference to chloroplast structure. ➢ Dark Phase (C3 – Cycle) ➢ C4 Cycle, CAM Cycle ➢ Importance of CO_2 and O_2 ratio Respiration ➢ Definition, Types of respiration, Factors affecting respiration ➢ Mechanism of respiration- glycolysis, Krebs Cycle ➢ Oxidative phosphorylation ➢ ATP synthesis in aerobic respiration	

REFERENCE:

- Duca M. 2015. Plant Physiology. Springer International Publishing. Switzerland.
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- An Introduction to Plant physiology by A.K. Ganguly and N. C. Kumar; Emkay Publications.
- Plant physiology by Robert M Devlin; Affiliated East–west Press Pvt Ltd.
- Text book of Plant Physiology by P. L. Kochhar and A.C. Joshi; Atma Ram and Sons
- Pant Physiology by R.C. Grewal; Campus books international
- An Introduction to Plant Physiology by W. O. James; Oxford university press.
- Plant Physiology by S. N. Pandey and B. K. Sinha; Vikas publishing house Pvt Ltd.
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- Advance in Plant Physiology Vol I, II and III by A. Hemantaranjan; Scientific Publishers
- Plant Physiology by Salisbury and Ross; Prentice/Hall of India Pvt. Ltd.
- Physiology of plant growth and development by M. B. Wilkins; Tata McGrew-Hill
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SYLLABUS FOR B.Sc. SEMESTER - IV
FRAMED ACCORDING TO
NATIONAL EDUCATION POLICY (NEP) 2020(Effective from December 2024)
BOP-MJ-VII
BOTANY (Major) PRACTICAL – VII

BOP-MJ-VII:	PHYTOTOMY	2 credits

- The candidates should study their environment and the typical vegetation in natural condition and should record their observation in journals.
- Excursion should be arranged during the year to local places.
- Every candidate shall complete laboratory course in accordance with the regulations issued from time to time by Academic Council on the recommendation of the Board of Studies.
- Every candidate shall record observation directly in the laboratory journal. Every journal shall be signed periodically.
- At the end of the semester candidate shall produce certified journal during the practical examination.

PART A – PHYTOTOMY: (60 Hours)

1. Study of following permanent slide.
   - Laticiferous tissue
   - Periderm
   - Lenticell
   - Latex cell
   - Stinging hair
2. To study primary tissue structure in dicot stem.
3. To study primary tissue structure in monocot stem.
4. To study the tissue structure in dicot root.
5. To study the tissue structure in monocot root.
6. To study permanent slides of anatomy.
   - Sunflower root T.S.
   - Maize root T.S.
   - Sunflower stem T.S.
   - Maize stem T.S.
   - Sunflower leaf T.S.
   - Maize leaf T.S.

7. To study anomalous secondary growth in Bignonia stem.
8. To study anomalous secondary growth in Nyctanthus stem.
9. To study anomalous secondary growth in Boerhaavia stem.
10. To study anomalous secondary growth in Dracaena stem.
11. To study anomalous secondary growth in Radish root.
12. To study anomalous secondary growth in Beet root.
13. To study anomalous secondary growth in Carrot root.
14. To study Unilacular node.
15. To study Trilocular node.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. SEMESTER - III

FRAMED ACCORDING TO

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BOP-MJ-VIII

BOTANY (Major) PRACTICAL – VIII

BOP-MJ-VIII:	PLANT PHYSIOLOGY	2 credits

- The candidates should study their environment and the typical vegetation in natural condition and should record their observation in journals.
- Excursion should be arranged during the year to local places.
- Every candidate shall complete laboratory course in accordance with the regulations issued from time to time by Academic Council on the recommendation of the Board of Studies.
- Every candidate shall record observation directly in the laboratory journal. Every journal shall be signed periodically.
- At the end of the semester candidate shall produce certified journal during the practical examination.

PART A – PLANT PHYSIOLOGY : (60 Hours)

1. Demonstration practical of transpiration
   - To demonstrate phenomenon of transpiration by four leaf experiment.
   - To demonstrate phenomenon of transpiration by Bell jar experiment.
2. To study stomata types and structure .
3. To study stomata index (upper and lower epidermis)
4. Demonstration practical of plant movement.
   - To demonstrate phototropism
   - To demonstrate hydrotropism
   - To demonstrate geotropism
5. To observe streaming movement (cyclosis) of the protoplasm.
6. To study the phenomenon of plasmolysis.
7. Separation of chloroplast pigment by chromatography technique.
8. Demonstration practical of photosynthesis
   - To demonstrate that light is necessary for photosynthesis using Ganong's screen.
   - To demonstrate that O_2 is evaluated during photosynthesis by inverted funnel method.
9. To study the Effect of natural light on photosynthesis
10. Effect of CO_2 concentration on photosynthesis

11. To study the Effect of different light on photosynthesis.

12. Demonstration practical of Respiration

- To demonstrate that CO_2 release during aerobic respiration.
- To demonstrate that O_2 used during respiration
- To demonstrate that energy is released in the form of heat during respiration.
- To compare the process of photosynthesis and respiration.
- To demonstrate the process of anaerobic respiration.

13. To perform the process of fermentation by Kuhne's tube.

REFERENCES:

- Bendre and Kumar, A Text book of Practical Botany II, Rastogi Publication

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BOTANY (Major) PAPER BO-MJ-403

BO-MJ-403 PLANT BIOGEOGRAPHY (4 credits)

BO-MJ-403	PLANT BIOGEOGRAPHY	60 hours
UNIT 1	Plant Biogeography of world:	15 Hours
	➢ Phytogeography - Introduction ➢ Major plant communities of world ➢ Phytogeographic regions of world (Vegetational belts) ➢ Biogeographic zones of India - overview	
UNIT 2	Plant Biogeography of India - I	15 Hours
	➢ Trans- Himalaya, ➢ West Himalaya, ➢ East Himalaya, ➢ Gangetic plain ➢ North East India,	
UNIT 3	Plant Biogeography of India - II	15 Hours
	➢ The Indian Desert, ➢ Semi arid zone, ➢ Western Ghats, ➢ Deccan peninsula,	
UNIT 4	Plant Biogeography of India – III	15 Hours
	➢ Indian coasts ➢ Andaman & Nicobar Islands ➢ Lakshadweep Island ➢ Aquatic and Wetland Vegetation	

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BO-ME-401

BOTANY (MINOR) PAPER – 401

BO-ME-401	LOWER CRYPTOGAMS	(2 credits)

BO-ME-401	LOWER CRYPTOGAMS	30 Hours
UNIT 1	Algae	15 Hours
	➢ Occurrence and distribution ➢ Range of Vegetative structure ➢ Cellular organization ➢ Reproduction ➢ Economic importance of Algae ➢ Classification of Algae ➢ Classification, Occurrence, Thallus structure and Life cycle of following genera: (i) Oscillatoria (ii) Nostoc (iii) Spirogyra (iv) Ectocarpus (v) Batrachospermum	
UNIT 2	Fungi	15 hours
	➢ Occurrence and distribution ➢ Thallus organization ➢ Cellular organization ➢ Reproduction ➢ Nutrition in fungi ➢ Economic importance of Fungi ➢ Classification of Fungi ➢ Classification, Occurrence, Thallus structure and Life cycle of following genera: (i) Mucor (ii) Peziza (iii) Agaricus ➢ Difference between algae and fungi	

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BOP-ME-402

BOTANY (MINOR) PRACTICAL – 402

BOP-ME-402	**BOTANY (MINOR) PRACTICAL – 402 :BASED ON BO-ME-401**	**(2 credits)**

BOP-ME-402	BASED ON BO-ME-401: ALGAE, FUNGI AND ANGIOSPERMS	**60 hours**
	PART A- ALGAE : (20 hours) 1. Study of external features of Oscillatoria thallus. 2. Study of Hormogonia in Oscillatoria. 3. Study of external features of Nostoc thallus 4. Study of akinetes in Nostoc. 5. Study of external features of Spirogyra thallus. 6. Study of scaleriform conjugation in Spirogyra. 7. Study of lateral conjugation in Spirogyra. 8. Study of external features of Ectocrapus thallus. 9. Study of unilocular sporangium in Ectocarpus. 10. Study of plurilocular sporangium in Ectocarpus. 11. Study of external features of Batrachospermum thallus. 12. Study of reproductive structure in Batrachospermum.	
	PART B –FUNGI (20 hours) 13. Study of mycellial structure of Mucor. 14. Study of Sporangia of Mucor. 15. Study of Zygospore of Mucor. 16. Study of vegetative structure in Peziza. 17. Study of Ascocarp of Peziza. 18. Study of vegetative structure in Agaricus. 19. Study of Basidiocarp of Agaricus.	

	PART C-ANGIOSPERMS : (20 hours) 20. Study of morphological characters, floral dissection, T.S. of ovary, and floral formula of Fabaceae family. 21. Study of morphological characters, floral dissection, T.S. of ovary, and floral formula of Asteraceae family. 22. Study of morphological characters, floral dissection, T.S. of ovary, and floral formula of Convolvulaceae family. 23. Study of morphological characters, floral dissection, T.S. of ovary, and floral formula of Euphorbiaceae family. 24. Study of morphological characters, floral dissection, T.S. of ovary, and floral formula of Palmaceae family.	

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2. College Botany A. C. Datta 3rd Edi. 1989 Oxford Bombay
3. Taxonomy of Angiosperms V. Singh 1st Edi. 1981 Rastogi pub.
4. Cryptogamic Botany Vol. I - II G.M.Smith 2nd Edi. 1955 Tata MCGrow Hill Bombay
5. A Text Book of Botany (Semester I) Dr. T.G.Gohil and Dr. Alpesh B. Thakor 1st Edi. 2018 Popular Prakashan, Surat
6. A text book of Botany vol. I (Algae, Fungi, Bacteria, Viruses, Lichen & Plant pathology) Pandey etal. - Vikash publishing House pvt. Ltd., New Delhi
7. A text Book of Botany paper III Dr. T.G.Gohil and Dr. Alpesh B. Thakor 1st Edi. 2019 Popular prakashan, Surat
8. The fungi, bacteria and viruses by Lokendra Singh; Rastogi Publications
9. A Brief Course in Algae K.P.Saxena 1965 Prakashan Kendra, Lucknow.
10. Introduction to Fungi S.Sundara Rajan 1st Edi. 2001 Anmol Publication, New Delhi
11. Botany for Degree Student- P.C. Vashishta 1st Edi.
12. Modern Practical Botany Vol. II B.P. Pandey 1995 S. Chand & Company, New delhi.
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17. A text book of Botany: The Algae by Brahma Prakash Pandey; Jai Prakash Nath and Co.

18. A class book of Algae by G.L. Chopra; S. Hagin and Co.

19. A text book on Algae by H.D. Kumar and H.S. Singh; East-west press.

20. Fungi, Bacteria and Viruses by H.C. Dube; Vikas publishing house

21. Pandey B P 2011. College Botany (Vol. 3). S. Chand & Co. Ltd, New Delhi, India

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23. Botany for Degree Student- P.C. Vashishta

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B.Sc. SEMESTER - IV
FRAMED ACCORDING TO
NATIONAL EDUCATION POLICY (NEP) 2020 (Effective from December 2024)
Skill Enhancement Courses
BO-SEC-401 : BONSAI TECHNIQUE

BO-SEC-401	**Skill Enhancement Courses : BONSAI TECHNIQUE** (1 credits)	15 hours
UNIT 1	**Techniques and requirements**	6 Hours
	➢ Introduction - history, aim, scope, and importance of Bonsai. ➢ Identification and collection of suitable plants for bonsai making. ➢ Tools, containers, wiring, and preparation of media. ➢ Pruning techniques in bonsai making. ➢ Irrigation method, pest and disease management.	
UNIT 2	**Styles of Bonsai**	9 Hours
	➢ Styles of Bonsai – 1. Upright. 2. Formal Upright. 3. Informal Upright. 4. Slanting. 5. Windswept. 6. Broom. ➢ Cascade Styles of Bonsai – 1. Semi Cascade. 2. Formal Cascade. 3. Informal or Vertical Cascade. 4. Displaying Cascade Style Bonsai. ➢ Multiple tree styles of Bonsai – 1. Two-Tree and Twin Trunk Style Bonsai. 2. Forest Style Bonsai. Bonsai with Special ➢ Characteristics. ➢ Economic importance of Bonsai.	

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Skill Enhancement Courses
BOP-SEC-402 : BONSAI TECHNIQUE

BOP – SEC - 402	**Skill Enhancement Practical Courses : BONSAI TECHNIQUE (1 credits)**	30 hours
	1 Study different tools used in Bonsai by chart/specimens. 2 Study different styles of bonsai by chart/specimens. 3 Study different containers of Bonsai. 4 Perform wiring branches on Bonsai. 5 Perform clamping for shaping branch. 6 Study the potting and repotting of Bonsai. 7 Study the soil composition of Bonsai. 8 Selecting planting material viz. seeds, cuttings and overcome beginnings problems. 9 Study the watering and feeding of Bonsai. 10 Study the pest and disease of Bonsai.	

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