



# Syllabus

## For B.Sc 6<sup>th</sup> Semester Courses in

### Botany

### (June 2020 onwards)

- Contents:
- Theory Syllabus for Courses:
  - SBOT0601 – Plant Growth Physiology
  - SBOT0602 – Environmental Botany
  
- Practical Course Syllabus for: SBOT06PR
- Evaluation and Assessment guidelines.

**T.Y. B.Sc. Botany**

**Course code: SBOT0601**

**Course Title: PLANT GROWTH PHYSIOLOGY**

**Learning Objectives:**

1. To understand biochemical steps of nitrogen assimilation, and differences between the process of inorganic and organic nitrogen fixation.
2. To comprehend the phenomenon of transformation of vegetative axis into reproductive axis and the substances responsible for this transformation.
3. To gain knowledge of the process and factors that facilitate seed germination and the physiology of fruit ripening.
4. To perceive the time measuring mechanism in plants and the aging process in plants.

**Number of lectures: 60**

**Unit 1**

**(15 lectures)**

**Fertilizers and Nitrogen Metabolism**

Assimilation of inorganic nutrients- NPK fertilizers, N<sub>2</sub> cycle, reduction of nitrate, assimilation of ammonia, Biological nitrogen fixation and its biochemistry, effects of nitrogen assimilation on carbohydrate utilization.

**Unit 2**

**(15 lectures)**

**Plant Growth**

Vegetative growth- definition, quantitative aspects of growth of annual plants, factors affecting growth. Reproductive growth- Initiation of flower primordia, environment and flower initiation (photoperiodism and vernalization), florigen.

**Unit 3**

**(15 lectures)**

**Plant Growth Substances**

Plant growth substances: biosynthesis, physiological role and practical applications of auxins, gibberellins, cytokinins, and ethylene (fruit ripening). Abscisic acid- Growth retarding chemicals and Brassinosteroids.

**Unit 4**

**(15 lectures)**

**Physiology of seeds, Aging**

Morphological and biochemical changes accompanying seed development and seed germination, dormancy. Aging and senescence, biological clock.

**List of Recommended Reference Books**

1. Noggle, Ray G.; Fritz, George J.; Introductory plant physiology; 2nd edition; New Delhi : Prentice-Hall Of India Private Limited , 1991.
2. Devlin, Robert M.; Witham, Francis H.; Plant Physiology; 4th edition, Indian reprint; Delhi : CBS Publishers & Distributors , 1986(2001).
3. Kochhar, P.L.; A textbook of Plant Physiology; 7th edition; Delhi :Atma Ram & Sons , 1964.
4. Verma S. K. Textbook of Plant physiology and Biochemistry ; S. Chand & Company Ltd,

2003.

5. Sinha, R.K.; Modern plant physiology; 2nd edition; New Delhi: Narosa Publishing House , 2004.

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**Practical: SBOTPR0601**

- I) To study the activity of nitrate reductase.
- II) To estimate the  $\alpha$ -amino nitrogen; total protein content by Lowry's method.
- III) Separation of amino acids by circular paper chromatography; and Fatty acids by TLC.
- IV) Inhibition of seed germination by inhibitors in fruit juices.
- V) Mobilization of starch during seed germination by amylases (qualitative)

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**T.Y. B.Sc. Botany**

**Course code: SBOT0602**

**Course Title: ENVIRONMENTAL BOTANY**

**Learning Objectives:**

1. To realize the role and importance of biotic and abiotic environmental factors in the sustenance of plant life.
2. To discern the causes, consequences, prevention, remediation of pollution and efforts taken in reducing or controlling the pollution causing factor.
3. To sense the importance of phytogeography and forestry for man and the legal enforcement imposed by government in preventing the loss to the natural regional flora.

**Number of lectures: 60**

**Unit 1**

**(15 lectures)**

**Abiotic Factors**

Light- quality, duration, absorption, intensity, effects on plants; Temperature- variation due to altitude, effects on plants, thermal constant, stratification; Water- Precipitation, moisture, rainfall measurement. Wind - speed, advantages and damage caused to plants. Soil- soil profile, texture, classification, moisture, water, organic matter, atmosphere, temperature, organisms.

**Unit 2**

**(15 lectures)**

**Biotic Interactions**

Biotic community relationships- mutualism, mycorrhizae, commensalisms, proto cooperation, competition, amensalism and saprophytism. Prey-predation model equation.

### **Unit 3**

(15 lectures)

#### **Pollution**

Causes of Pollution: Light, Noise, Water, Soil and Air. Effect of pollution on plants: Light, Noise, Water, Soil and Air. Mitigation of pollution by plants: Noise, Water, Soil and Air.

### **Unit 4**

(15 lectures)

#### **Forestry**

Types of forests, destruction of forests, deforestation, afforestation, reforestation, institutions for forest research, education and training; Biosphere reserves. Forest Conservation act, 1980; Environment Protection Act 1986; The Indian Wildlife (Protection) Act – 1972 amended 1991.

#### **List of Recommended Reference Books**

1. Ambasht, R. S. - A text book of plant ecology.
  2. Odum, E. P., Fundamental of Ecology (1971): W B Saunders Company.
  3. Jogdand, S.N., 1995. Environmental Biotechnology. Himalaya Publishing House, Mumbai.
  4. Sharma, P. D., Ecology and environment; Rastogi publications, Meerut. 7th ed – 2004.
  5. Subrahmanyam, N.S., and Sambamurty, A.V.S.S., Ecology- Narosa Publishing House, 2000;
  6. Day, A. K., Environmental Chemistry, Fourth Edition, New Age International Publishers-2002
  7. Santra, S.C., Environmental Science; Central Publ. New Delhi.
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#### **Practical: SBOTPR0602**

- I) Study of ecological instruments i.e. lux meter, rain guage, hygrometer, wet and dry bulb thermometer, wind anemometer, maximum and minimum thermometer, barometer.
- II) To study the moisture, carbonate, nitrate, base deficiency, pH of soil by use of rapid tests.
- III) Determination: of salinity, chlorinity, BOD of water sample; organic matter and carbon from soil.
- IV) Determine percent leaf area injury of infected leaf samples.
- V) Identification of Phytogeographical area from map w.r.to distribution, rainfall, vegetation.

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**Evaluation and Assessment: SBOT0601 and SBOT0602 courses**

**Evaluation (Theory): Total marks per course - 100.**

**CIA- 40 marks**

CIA 1: Written test -20 marks

CIA 2: Written Test / Assignment / Presentation / Field Trip -20 marks

**End Semester Examination – 60 marks**

One question from each unit for 15 marks, with internal choice. Total marks per question with choice -20 to 25.

**Evaluation of SBOT6PR (Practical) Total marks per Practical course - 100.**

**End Semester Practical Examination – (SBOTPR0601- 50 marks and SBOTPR0602- 50 marks)**

**Template for SBOT0501 Course End Semester Examination in Semester 5**

UNITS	KNOWLEDGE	UNDERSTANDING	APPLICATION and ANALYSES	TOTAL MARKS- Per unit
1	05	05	05	15
2	08	07	00	15
3	06	06	03	15
4	05	06	04	15
<b>-TOTAL - Per objective</b>	24	24	12	<b>60</b>
<b>% WEIGHTAGE</b>	40	40	20	<b>100%</b>

**Template for SBOT0502 Course End Semester Examination in Semester 5**

UNITS	KNOWLEDGE	UNDERSTANDING	APPLICATION and ANALYSES	TOTAL MARKS- Per unit
1	10	05	0	15
2	08	07	0	15
3	06	04	05	15
4	10	05	0	15
<b>-TOTAL - Per objective</b>	34	21	05	<b>60</b>
<b>% WEIGHTAGE</b>	56.66	35.00	8.33	<b>100%</b>





St. Xavier's College, Mumbai.  
**ASSESSMENT OF BOTANY FIELD TRIP REPORT**

Dept. of Botany; Course Code \_\_\_\_\_ Date \_\_\_\_\_ Roll No \_\_\_\_\_

Name of student: \_\_\_\_\_ UIDNo \_\_\_\_\_ Marks \_\_\_\_\_ / 20

Place of visit \_\_\_\_\_

**Assessment Grid :** Place one tick in each appropriate row. Overall mark should reflect the positions of ticks in the individual rows

(20)	Field Trip and Report	80-100% 17-20 Marks	60-80% 13-16 Marks	40-60% 09-12 Marks	20-40% 05-08 Marks	0-20% 0-04 Marks
30%  (06)	<b>Organization of report</b>  -----Marks----- -	Introduction about the location, vegetation, Botanical Names, Family, Local name, Description using Botanical Term, reporting all the species seen, Handwritten or typed.  6	Few mistakes, few species missing from the report  5	Many mistakes  4	Inadequate presentation, ineffective format, lack or relevant detail, but an attempt  3	No attempt to organize  2
50%  (10)	<b>Content</b>  -----Marks-----	Excellent reporting of all the species observed in the field, ecological and morphological data,  10 / 9	Good reporting, species observed in the field but few of them missing in the list  8	Satisfactory, many species or relevant data missing from the report  6	Poor, inadequate and insufficient data or just a list of the species without any data.  5	Very poor, no data  4 / 3
10% (02)	<b>Conclusion</b>  -----Marks-----	Excellent conclusion based on self observation. Type of forest and vegetation  2	Good conclusion, comments not independent  2 / 1	Satisfactory, but insufficient  1 / 0.5	Poor, irrelevant conclusion  0.5	Very poor, no conclusion  0.5
5% (01)	<b>References</b>  -----Marks----- -	Proper references, in required format  1	Proper references but no format  1	Few references  0.5	Irrelevant references  0	No references  0
5% (01)	<b>Attendance / participation</b>  -----Marks----- -	Attended and participated actively  1	Attended and participated  1	Infrequent Participation  0.5	No participation  0	Absent  0

Comments:

Name and Signature of Faculty \_\_\_\_\_.



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**ASSESSMENT OF INDIVIDUAL ORAL PRESENTATION -A**

Dept. of Botany; Course Code \_\_\_\_\_ Date \_\_\_\_\_ Roll No \_\_\_\_\_

Name of student: \_\_\_\_\_ UIDNo \_\_\_\_\_ Marks \_\_\_\_\_/ 20

Title of oral presentation: \_\_\_\_\_

**Assessment Grid :** Place one tick in each appropriate row. Overall mark should reflect the positions of ticks in the individual rows**Presentation: 30 % (06 marks)**

30%	PRESENTATION	80-100%	60-80%	40- 60%	20-40%	0-20%
10 %	<b>Presentation skills</b>	Varied rate of delivery, Changed pitch for emphasis, No distracting mannerisms ,good eye contact , Confident body language, Connected with audience	Good but a few weaknesses	Good but a few weaknesses with one pronounced weakness	Several Weaknesses	No speech variation, Distracting mannerisms, no eye contact, dull, and reading from notes/visual aids
2.0	----- Marks -----	2.0	1.5	1.0	1.0	0.5
10 %	<b>Use of Visuals ( Efforts to Aid Presentation)</b>	Very good, relevant visuals, good font size/ image size, Appropriate number of words and images per slide, good colour schemes	Good but a few weaknesses	Good but a few weaknesses with one pronounced weakness	Several Weaknesses	Very poor visuals, visuals did not contribute to the presentation
2.0	----- Marks -----	2.0	1.5	1.0	1.0	0.5
5%	<b>Timing and Pace of Talk</b>	Right length and well paced	Right Length but too slow or too rushed	Long or short <i>and</i> too slow or too rushed	Too long <i>or</i> too short	Had to be stopped <i>or</i> less than 50% of the allocated time
01	----- Marks -----	1.0	0.5	0.5	0	0
5%	<b>Audibility and Comprehensibility</b>	Very clear and very precise	Clear, quite precise	Almost inaudible <i>and</i> difficult to understand	Almost inaudible <i>or</i> very difficult to understand	Inaudible <i>or</i> completely incomprehensible
01	----- Marks -----	1.0	1.0	0.5	0.5	0

Total marks for presentation: \_\_\_\_\_ out of 06 marks.

**Content: 70% (14 Marks)**

70%	CONTENT	80-100%	60-80%	40- 60%	20-40%	0-20%
35%	<b>Knowledge and Understanding Innovation</b> Impression of wide reading, good knowledge and complete understanding 07 ----- Marks -----	Excellent  7.0	Good  6.0 / 5.0	Satisfactory  4.0 / 3.0	Poor  2.0	Very Poor  1.0
10%	<b>Structure of Presentation</b> Logical Structure, Clear Introduction, Body and Relevant Conclusion, sequence of information and ideas could be easily followed , Citation of source material 02 ----- Marks -----	Excellent  2.0	Good  2.0	Satisfactory  1.0	Poor  0.5	Very Poor  0.5
5%	<b>Key Points/ Themes</b> Identified Key Points, Kept to the points throughout the presentation- did not wander 01 ----- Marks -----	Excellent  1.0	Good  1.0	Satisfactory  0.5	Poor  0.5	Very Poor  0
10%	<b>Ability to answer Questions</b> Answers accurate and full of confidence 02 ----- Marks -----	Excellent  2.0	Good  1.5	Satisfactory  1.0	Poor  0.5	Very Poor  0
10%	<b>Creation of Interest/ Audience Participation</b> Created interest in the topic 02 ----- Marks -----	Excellent  2.0	Good  1.5	Satisfactory  1.0	Poor  1.0	Very Poor  0.5

Total for content: \_\_\_\_\_ out of 14; Total marks for oral presentation: \_\_\_\_\_ out of **20**

Comments:

Name of the Faculty \_\_\_\_\_.

Signature of the Faculty \_\_\_\_\_

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**ASSESSMENT OF INDIVIDUAL ORAL PRESENTATION -B**

Dept. of Botany; Course Code \_\_\_\_\_ Date \_\_\_\_\_ Roll No \_\_\_\_\_

Name of student: \_\_\_\_\_ UIDNo \_\_\_\_\_ Marks \_\_\_\_\_ / 20

Title of oral presentation: \_\_\_\_\_

**Assessment Grid :** Place one tick in each appropriate row. Overall mark should reflect the positions of ticks in the individual rows**Presentation: 40 % (8 marks)**

40%	PRESENTATION	80-100%	60-80%	40- 60%	20-40%	0-20%
15 %	<b>Presentation skills</b>	Varied rate of delivery, Changed pitch for emphasis, No distracting mannerisms ,good eye contact , Confident body language, Connected with audience	Good but a few weaknesses	Good but a few weaknesses with one pronounced weakness	Several Weaknesses	No speech variation, Distracting mannerisms, no eye contact, dull, and reading from notes/visual aids
03	----- Marks -----	3.0	2.5	2.0	1.5	1.0
15 %	<b>Use of Visuals ( Efforts to Aid Presentation)</b>	Very good, relevant visuals, good font size/ image size, Appropriate number of words and images per slide, good colour schemes	Good but a few weaknesses	Good but a few weaknesses with one pronounced weakness	Several Weaknesses	Very poor visuals, visuals did not contribute to the presentation
03	----- Marks -----	3.0	2.5	2.0	1.5	1.0
5%	<b>Timing and Pace of Talk</b>	Right length and well paced	Right Length but too slow or too rushed	Long or short <b>and</b> too slow or too rushed	Too long <b>or</b> too short	Had to be stopped <b>or</b> less than 50% of the allocated time
01	----- Marks -----	1.0	1.0	0.5	0.5	0
5%	<b>Audibility and Comprehensibility</b>	Very clear and very precise	Clear, quite precise	Almost inaudible <b>and</b> difficult to understand	Almost inaudible <b>or</b> very difficult to understand	Inaudible <b>or</b> completely incomprehensible
01	----- Marks -----	1.0	1.0	0.5	0.5	0

Total marks for presentation: \_\_\_\_\_ out of 08 marks.

**Content: 60% (12 Marks)**

60%	CONTENT	80-100%	60-80%	40- 60%	20-40%	0-20%
25%	<b>Knowledge and Understanding Innovation</b> Impression of wide reading, good knowledge and complete understanding ----- Marks -----	Excellent	Good	Satisfactory	Poor	Very Poor
05		5.0	4.0	3.0	2.0	1.0
10%	<b>Structure of Presentation</b> Logical Structure, Clear Introduction, Body and Relevant Conclusion, sequence of information and ideas could be easily followed , Citation of source material ----- Marks -----	Excellent	Good	Satisfactory	Poor	Very Poor
02		2.0	1.5	1.0	0.5	0.5
5%	<b>Key Points/ Themes</b> Identified Key Points, Kept to the points through out the presentation- did not wander. ----- Marks -----	Excellent	Good	Satisfactory	Poor	Very Poor
01		1.0	1.0	0.5	0.5	0
10%	<b>Ability to answer Questions</b> Answers accurate and full of confidence ----- Marks -----	Excellent	Good	Satisfactory	Poor	Very Poor
02		2.0	1.5	1.0	0.5	0
10%	<b>Creation of Interest/ Audience Participation</b> Created interest in the topic. ----- Marks -----	Excellent	Good	Satisfactory	Poor	Very Poor
02		2.0	1.5	1.0	0.5	0

Total for content: \_\_\_\_\_ out of 12; Total marks for oral presentation: \_\_\_\_\_ out of **20**

Comments:

Name of the Faculty \_\_\_\_\_.

Signature of the Faculty \_\_\_\_\_