TEACHING PLAN: Plant Metabolism (Dr. Santosh Joshi)

<table>
<tr><td colspan="3">SCHOOL: (SOBAS)
SCHOOL OF BASIC & APPLIED SCIENCES</td><td colspan="2">ACADEMIC SESSION: 2024</td><td>FOR STUDENTS' BATCH: B.Sc. Bio Semester IV</td></tr>
<tr><td>1</td><td>Course code</td><td colspan="4">BOT-204</td></tr>
<tr><td>2</td><td>Course Title</td><td colspan="4">Plant Metabolism</td></tr>
<tr><td>3</td><td>Credits</td><td colspan="4">3</td></tr>
<tr><td rowspan="4">4</td><td rowspan="4">Learning Hours</td><td rowspan="4"></td><td>Contact Hours</td><td>38</td><td rowspan="4"></td></tr>
<tr><td>Practical Teaching</td><td>30</td></tr>
<tr><td>Project, Tutorial and Assessment</td><td>22</td></tr>
<tr><td>Total hours</td><td>90</td></tr>
<tr><td>5</td><td>Course Objective</td><td colspan="4">1.This course aims to educate student about the various metabloc pathways leadito the formation of significant molecules and their catabolism.
2. It focuses upon the vital role of each of these molecules in plants.</td></tr>
<tr><td>6</td><td>Course Outcomes</td><td colspan="4">After completing the course, the students will be able to:
. 1. The student will enrich themselves with the phenomenon of metabolism of
. primary and secondary metabolites and their role in plants.
. 2. They are upgraded in analytical skills and instrumentation.</td></tr>
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THEORY

Unit	Title & Contents	Number of Hours	Learning outcome	Course Outcome
Unit 1:	Photosynthesis: Significance; historical aspects; photosynthetic pigments; action spectra and enhancement effects; concept of two photosystems; Z-scheme; photo-phosphorylation; Calvin cycle; C4 pathway; CAM plants; photorespiration.	10	Know about thebasics of photosynthesis and its system in plants	CO1
Unit 2:	Respiration: ATP–the biological energy currency; aerobic and anaerobic respiration; Krebs cycle; electron transport mechanism (chemi-osmotic theory); redox -potential; oxidative phosphorylation; pentose phosphate pathway.	10	Study the importance of respiration and the organelles attached to it	CO1, CO2
Unit 3:	Nitrogen metabolism: Biology of nitrogen fixation; importance of nitrate reductase and its regulation; ammonium assimilation. Lipid metabolism: Structure and functions of lipids; fatty acid biosynthesis; B-oxidation; saturated and unsaturated fatty acids; storage and mobilization of fatty acids.	10	Identify nitrogen fixing bacteria and anabolism and catabolism process in plants	CO2
Unit 4:	Basics of Enzymology: Discovery, nomenclature & characteristics of enzymes; concept of holoenzyme, apoenzyme, coenzyme & co-factors; regulation of enzyme activity.	10	Identify the mechanism of enzymology in plants	CO2
	Augmentation done	NA		

Portions for Sessional examination

I - Sessional Exam	II- Sessional Exam	III- Sessional Exam	Re-Sessional Exam
Unit 1,2	NA	NA	Unit 1 2 3,4

Chapter No.	Title & Contents of the chapter	After completion of the chapter the student shall be able to	Skills and Competency Developed	Course Outcome
	Augmentation done	NA		

Portions for sessional examination

I- Sessional Exam	II- Sessional Exam	III- Sessional Exam	Re-Sessional Exam
Unit 1	NA	NA	Unit 1,2,3,4

Assessment of course outcomes:

Assessment method	Course outcomes in Percentage					
	CO1	CO2	CO3	CO4	CO5	CO6
Unit Test	√	√	√	√	√	
Sessional Examination						
Pre-final Exam			√	√	√	√
Assignment	√	√	√	√	√	√

Others Specify						

Course Outcomes-Program Outcomes mapping

COs	**Program Outcomes**										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
CO1	√	√			√			√	√		**5**
CO2	√	√			√			√	√		**5**
CO3	√		√		√	√		√	√		**6**
CO4	√		√		√	√		√	√	√	**7**
CO5	√	√	√		√	√		√	√	√	**8**
CO6					√	√					2
Total	**5**	**3**	**3**		**5**	**3**		**5**	**5**		

Modes of delivery of courses

Methodology	**Code**
Lecturing	**a**
Discussion	**b**
Group discussion	**c**
Demonstration	d
Power point presentation	e
Tutorial class	f
Assignment	**g**
Remedial class	i
Industrial visit	k
Quiz	m
Others specify	o

Assessment Method	**Code**
Viva	**A**
Continuous assessment	**C**
Unit test	**D**
Sessional exam	**E**
Assignments	**G**
Others specify	H

Teaching Aids used	Code
Marker & board	**I**
Power point	**II**
Videos	**III**
Posters	IV
Charts	V
Others specify	VIII

List of prescribed text books from University Syllabus

Sl No	Title of the book	Author/s	Edition, Year of Publication	Publisher	No. of copies available in the library
1	A text book of botany (IV Ed).	Singh, V.P. Pandey, P.C. & Jain, D.K.	2013	Rastogi & Co., Meerut.	

List of text books for Augmented Syllabus

Sl No	Title of the book	Author/s	Edition, Year of Publication	Publisher	No. of copies available in the library
1					
2					

List of Reference text books from University Syllabus

Sl No	Title of the book	Author/s	Edition, Year of Publication	Publisher	No. of copies available in the library

1	Life Processes in Plants	Galston, A.W.	1989	Scientific American Library, Springer-Verlag, New York, USA.	
2	Introduction to Plant Physiology. .	Hopkins, W.G. and Huner, A.	2008	John Wiley and Sons.U.S.A.4th edition.	
	Introduction to Plant Physiology	Hopkins, W.G.	1995	John Wiley & Sons, Inc., New York, USA.	

List of Journals / Articles / Dissertations

Sl No	Title of the book	Author/s	Edition, Year of Publication	Publisher	No. of copies available in the library
1					
2					
3					
4					

List of URLs / Blogs / Other e-Sources

Sl No	Title of the book	Author/s	Edition, Year of Publication	Publisher	Web-address
1	https://www.sciencedirect.com/science/article/pii/B9780123743800500117 2.				
2	https://www.sciencedirect.com/science/article/pii/B9780408701495500191				
3	https://www.youtube.com/watch?v=0UEpq1W9C_E 2.				
4	https://www.youtube.com/watch?v=RiGlzcS8jV4 3.				
5	https://www.youtube.com/watch?v=ZQzLqjOqbD0 4.				
6	https://www.youtube.com/watch?v=uSO6Jbg8Vd8				
7	https://www.youtube.com/watch?v=f6ctdQtz6do				
8	https://www.youtube.com/watch?v=bUjVHUf4d1I 6.				

Questions

Unit-1

Sl No	Question	Max Marks	Related course outcome
1	What are the functions of a photosynthesis?	10	CO 1
2	What are the parts of a flower involve in photoysnthesis?		CO 1
3	State the role of PS I		CO 1
4	State the role of PSII		CO 1
5	Differentiate PSI and PSII with diagrma		CO 1
6	Describe pigmens		CO 1
7	Describe chloroplast with well-labelled diagrams.		CO 1

Unit 2

Sl No	Question	Max Marks	Related course outcome
1	What is respiration?	10	CO1
2	Which cellular organelle involve in respiration		CO1
3	What are the aerobic and anaerobic respiration?		CO1
4	Explain the structure of mitochondria.		CO1
5	Explain Glycolysis in detail.		CO1
6	Describe the importance of redox potential in respiration.		CO1
7	Why Kreb's cycle is important for respiration		CO1
8	Describe the role of ETC in respiration.		CO1

Unit 3

Sl No	Questions	Max Marks	Related course outcome
1	Which is nitrogen fixation?	10	CO2
2	Define nitrification and denitrification.		CO2
3	What are the types of nitrogen fixation?		CO2
4.	What are lipids? Describe the types of lipids		CO2
5.	What are fatty acids and its types?		CO2
6	Make a comparative account on lipid synthesis and oxidation		CO2
7	Draw well-labelled diagrams of beta oxidation in lipids.		CO2

Unit 4

Sl No	Questions	Max Marks	Related course outcome
1.	What are enzymes?	10	CO2
2.	Explain the differences between enzymes and catalysts.		CO2
3.	Describe the nomenclature in enzymes.		CO2
4.	How enzymes can be classified?		CO2
5.	Describe the different types of enzyme inhibition.		CO2
6.	Explain the competitive and non-competitive inhibition in enzymes.		CO2
7.	Discuss various theories associate with enzymatic activity.		CO2
8.	Discuss the characteristic and specificity of enzymes.		CO2

S.No	Classification	Name of the students
	Slow learners (less than 50 %)	None
	Actions taken	
1	Remedial teaching	
2	Questions for practice	
3	Special guidance beyond college hour	
4	Trace out physical and mental problems if any	
5	Encourage even for small achievement	
6	Giving memory tip	
7	Review time to time	

S.No	Classification	Name of the students
	Average learners (51-75 %)	Mohit Kumar
	Actions taken	
1	Motivate students	**yes**
2	Audio-visual aids	
3	Create confidence level in their interest areas	**yes**
4	Mind map	

Feedback on Curriculum

Formats have been developed for the following stakeholders

1. Present / Current students
2. Students just passing out (Exit Interview)
3. Alumni
4. Parents
5. Industry based supervisors
6. Placement (campus recruiters)
7. Departmental Advisory Board