



Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Parner

Tal. Parner, Dist. Ahmednagar - 414 302 (Maharashtra)



4th Cycle

Assesment and Accreditation

Criterion-1

Cirricular Aspects

KI : 1.3 Curriculum Enrichment

QnM - 1.3.2

Percentage of students undertaking project work/field work/Internships



NAAC 'A' Grade
Best College Award
by SPPU, Pune

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's New Arts, Commerce & Science College

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Ref. No. NAC&S

Date : 24/ 11 /2022

DECLARATION

This is to declare that the information, reports, true copies of the supporting documents, numerical data, etc. submitted/presented in this file is verified by Internal Quality Assurance Cell (IQAC) and is correct as per the records. This declaration is for the purpose of NAAC accreditation of HEI for 4th Cycle period 2017-18 to 2021-22.

Date: 24/11/2022

Place: **Parner**


Prof. (Dr.) D. R. Thube

IQAC Coordinator

IQAC COORDINATOR
New Art's, Commerce & Science College
Parner, Dist. Ahmednagar




Dr. R. K. Aher

IQAC Chairman and Principal

PRINCIPAL
New Arts, Commerce & Science College
Parner, Tal. Parner, Dist. Ahmednagar

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1. B.A. Geography

a. Course Structure

CBSE: 2020-21

S.Y.B.A.

Geography



Savitribai Phule Pune University

(Formerly University of Pune)

S.Y.B.A. (Geography) Correction

Choice Based Credit System Syllabus

To be implemented from Academic Year 2020-2021

Semester	Core Courses	Paper No	Paper Code	Subject	Total Lecture	Credit
III	Geography CC-1C	G2	Gg: 201(A)	Environmental Geography I OR Economic Geography -I	48	3
	Geography DSE – 1A	S1	Gg: 220(A)	Geography of Maharashtra - I OR Population Geography – I	48	3
	Geography DSE – 2A	S2	Gg: 210(A)	Practical Geography – I (Scale and Map Projections)	60	4
	SEC-I		SEC - A	Introduction to Geographical Information System (GIS) / Applied Course of Disaster	30	2

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CBSE: 2020-21		S.Y.B.A.		Geography		
IV	Geography CC-1C	G2	Gg: 201(B)	Management Environmental Geography II OR Economic Geography -II	48	
	Geography DSE – 1B	S1	Gg: 210(B)	Geography of Maharashtra – II OR Population Geography – II	48	3
	Geography DSE – 2B	S2	Gg: 220(B)	Practical Geography – II (Cartographic Techniques, Surveying and Excursion / Village / Project Report)	60	4
	SEC-I		SEC - B	& Introduction to Remote Sensing / Applied Course of Travel & Tourism	30	2

S. Y. B. A. GEOGRAPHY

Equivalence of Previous syllabus along with new syllabus:

Pager	Old Course (2013 Annual Pattern)	New Course (2019 Semester Pattern)
G2	Gg-210 Elements of Climatology and Oceanography OR	Gg: 210(A)Environmental Geography I OR Gg: 210(A)Economic Geography -I
G2	Gg-210 Geography of Disaster Management	Gg: 210(B)Environmental Geography II OR Gg: 210(B)Economic Geography -II
S1	Gg-220 Economic Geography OR	Gg: 220(A)Geography of Maharashtra - I OR Gg: 220(A) Population Geography – I
S1	Gg-220 Tourism Geography	Gg: 220(B) Geography of Maharashtra – II OR Gg: 220(B) Population Geography – II
S2	Gg-201 Fundamentals of	Gg: 201(A)Practical Geography – I (Scale and Map Projections)
S2	Geographical Analysis	Gg: 201(B)Practical Geography – II (Cartographic Techniques, Surveying and Excursion / Village / Project Report)

b. Course Syllabus**CBSE: 2020-21****S.Y.B.A.****Geography****S.Y.B.A. Geography (S2), Syllabus for Semester IV****Name of the Subject: Cartographic Techniques, Surveying and Excursion
/ Village / Project Report subject Code: Gg. 201 (B)****Practical Geography-II No. of Credits: 04**

Workload: Six Periods per week per batch consisting of 12 Students; however the last batch needs to have more than six students.

(Examination for the course will be conducted at the end of the semester)

Objectives of Course:

1. To introduce the students to the basic and contemporary concepts in Cartography.
2. To acquaint the students with the utility and applications of various Cartographic Techniques.
3. To introduce the latest concepts regarding the modern cartography in the field of Geography.
4. To explain the elementary and essential principles of practical work in Geography.

Course Outcome:

1. Learn the basic concepts in practical geography.
2. Able to develop and use of map scale and projections.
3. Aware of the new techniques, accuracy and map making skills.

Note :

1. Use of Map stencils, Log tables, Calculators, Statistical Tables is allowed at the time of Examination.
2. Journal completion by the students and the certified by practical in-charge and Head of the Department is compulsory.
3. Students without a certified journal should not be allowed for the practical examination.
4. Each of the practical batches needs a separate question paper.

CBSE: 2020-21

S.Y.B.A.

Geography

Reference Books:

1. Sharma J. P., 2010, Prayogic Bhugol, Rastogi Publishers, Meerut.
2. Singh R. L. and Singh R. P. B., 1999, Elements of Practical Geography, Kalyani Publishers.
3. Slocum T. A., McMaster R. B. and Kessler F. C., 2008, Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall.
4. Tyner J. A., 2010, Principles of Map Design, The Guilford Press.
5. Sarkar A., 2015, Practical Geography: A Systematic Approach, Orient Black Swan Private Ltd., New Delhi
6. Singh R. L. and Dutta P. K., 2012, Prayogatama Bhugol, Central Book Depot, Allahabad
7. Ahirrao Y., Karanjkehele E. K., 2002, Practical Geography, Sudarshan Publication, Nashik
8. Saptarshi P. G., Jog S. R., Statistical Methods ,
9. Karlekar S. N., 2008, Statistical Methods, Diamond Publication, Pune
10. Kanetkar T. P., Kulkarni S. V., 1986, Surveying and Leveling, Pune Vidyarthi Griha Publication, Pune
11. Kumbhare A., Practical Geography,
12. Saha P., Basu P., 2007, Advanced Practical Geography, Books and Allied (P) Ltd, Kolkata
13. Advanced Practical Geography: 2007, Saha P., Basu P., Books and Allied (P) Ltd, Kolkata

2. B.A Geography

a. Course Structure

CBCS: 2021-22

T.Y.B.A.

Geography



Savitribai Phule Pune University

(Formerly University of Pune)

**Three Year B.A. and B.Sc. Degree Program in Geography (Faculty
of Science & Technology)**

T.Y.B.A. (Geography)

Savitribai Phule Pune University

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CBCS: 2021-22

T.Y.B.A.

Geography

Program Outcome – BA –Geography

Students of all undergraduate general degree programs should have acquired the following abilities/values at the time of graduation:

Programme: B.A. (Bachelor of Arts)	
General	
PO1:	Define and develop the interdisciplinary approach through the study of Geography
PO2:	Enhance employability and entrepreneur skills among the students.
PO3:	Demonstrate and appreciate the importance of diverse cultural, economic, regional, and resources perspective.
PO4:	Realization the importance of relation between Geography and various branches of Humanities, mental moral sciences.
PO5:	Demonstrate and understand the important concept and theories in the field of Geography.
Subject specific	
PO6:	Demonstrate knowledge of physical and cultural features of the earth surface.
PO7:	Define basic disciplines of Geography and its sub branches.
PO8:	Discuss the basic concepts and terminologies used in Geography like interior of the earth, plate tectonic, sea floor spreading, population growth, disasters, composition and structure of atmosphere, hydrosphere, etc.
PO9:	Distinguish between minerals and rocks, weather and climate, interior of the earth, basic industries, farming etc.
PO10:	Describe the causes and effects of local, national and international problems like global warming, acid rain, ozone depletion, soil degradation, deforestation etc.
Institutional	
PO11:	Encourage to develop overall personality with soft skills and vocational competence among the students
PO12:	Enhance and rediscover knowledge skills and holistic approach towards life.

CBCS: 2021-22

T.Y.B.A.

Geography

Choice Based Credit System Syllabus**To be implemented from Academic Year 2021-2022**

T.Y.B.A. (Geography) Choice Based Credit System Syllabus

To be implemented from Academic Year 2021-2022

Course Structure**F. Y. B. A. GEOGRAPHY**

Sr. No.	Semester	Course No	Name of the Course	Category
1	Semester I	Gg.110 (A)	Physical Geography	CC – 1 A
2	Semester II	Gg.110 (B)	Human Geography	CC – 1 B

S. Y. B. A. GEOGRAPHY

Paper Code	Semester	Paper	Subject
Gg: 210(A)	III	G2 CC1C	Environmental Geography I OR Economic Geography -I
Gg: 220(A)	III	S1 DSE 1 A	Geography of Maharashtra - I OR Population Geography – I
Gg: 201(A)	III	S2 DSE 2 A	Practical Geography – I (Scale and Map Projections)
(Value/skill based course)	III	SEC 2 A	Applied Course of Disaster Management
Gg: 210(B)	IV	G2 CC1D	Environmental Geography- II OR Economic Geography -II
Gg: 220(B) DSE 1 B	IV	S1 DSE 1 B	Geography of Maharashtra – II OR Population Geography – II
Gg: 201(B) DSE 2 B	IV	DSE 2 B	Practical Geography – II (Cartographic Techniques, Surveying and Excursion / Village / Project Report)
(Value/skill based course)	IV	SEC 2 B	Applied Course of Travel and Tourism Geography

CBCS: 2021-22

T.Y.B.A.

Geography

T.Y.B.A. Geography

Paper Code	Semester	Paper	Subject
Gg: 310(A)	V	CC1E	Geography of Disaster Management-I OR Geography of Tourism- I
Gg: 320(A)	V	DSE 1 C	Geography of India -I OR Geography of Rural Development -I
Gg: 301(A)	V	DSE 2 C	Practical Geography – I (Techniques of Spatial Analysis)
(Value/skill based course)		SEC 2C	Research Methodology – I
Gg: 310(B)	VI	CC1F	Geography of Disaster Management-II OR Geography of Tourism -II
Gg: 320(B)	VI	DSE 1D	Geography of India -II OR Geography of Rural Development -II
Gg: 301(B)	VI	DSE 2D	Practical Geography – II (Techniques of Spatial Analysis, Surveying and Excursion / Village / Project Report
(Value/skill based course)		SEC 2 D	Research Methodology – II

Equivalence of Previous syllabus along with new syllabus:

Paper	Old Course	New Course
G3	Gg-310 Regional Geography of India OR Gg-310 Human Geography	Geography of Disaster Management-I OR Geography of Tourism- I
G3		Geography of Disaster Management-II OR Geography of Tourism- II
S3	Gg-320 Agricultural Geography OR Gg-320 Population and Settlement Geography	Geography of India –I OR Geography of Rural Development -I
S3		Geography of India –II OR Geography of Rural development -II
S4	Gg-301 Techniques of Spatial Analysis	Practical Geography – I (Techniques of Spatial Analysis)
S4		Practical Geography – II (Techniques of Spatial Analysis, Surveying and Excursion / Village / Project Report

b. Course Syllabus

CBCS: 2021-22

T.Y.B.A.

Geography

Semester VI

Practical Geography- II (Techniques of Spatial Analysis, Surveying and Excursion /Village/ Project Report) DSE- 2 D

(No. of Credits: 04)

Course Outcome:

1. Create the awareness about the open source software and techniques of visualization
2. Describe basic of Statistical data and the skill of data representation
3. Calculate Central Tendency, Variance and Standard Deviation, Correlation and Regression, and Testing of Hypothesis
4. Conduct Survey of socio-economic conditions of a village/ field investigation and report writing.

Workload: Six Periods per week per batch consisting of 12 Students; however the last batch needs to have more than six students.

(Examination for the course will be conducted at the end of the semester)

Sr. No.	Topic	Sub Topic & learning Points	No. of Lectures
1.	Geographical Data and its Basic Analysis	a. Introduction and Types of Geographical Data: i) Spatial and Temporal data ii) Discrete and Continuous series iii) Ungrouped and Grouped data b. Basic Analysis : i) Tally marks and frequency table ii) Frequency distribution (Histogram and Polygon) iii) Cumulative Frequency & Ogive curve	15
2.	Measures of Central Tendency and Dispersion	a. Meaning and description of central tendencies- Mean, Mode and Median b. Measures of Mean, Mode, Median for ungrouped and grouped data (two examples each) c. Measures of Dispersion: Ungrouped and Grouped data, Mean Deviation and Standard Deviation (two exercise each)	15
3.	Testing and Application of Hypothesis	a) Meaning, Definition of Hypothesis and Types of Hypothesis: i) Null and Alternative hypothesis ii) Level of significance, iii) Degrees of freedom in Hypothesis b) Concept of Correlation and Regression i. Concept of bivariate correlation and Regression ii. Meaning of coefficient of correlation iii. Parametric and Non parametric test: Chi-square test (two examples each) iv. Calculation of Spearman Rank order (Min. two examples for each test)	15

CBCS: 2021-22

T.Y.B.A.

Geography

4.	Field Excursion / Village Survey	<p>a. One Short tour of two days duration and preparation of tour report OR</p> <p>b. One long tour of more than Five days duration anywhere in the country and preparation of tour report OR</p> <p>c. Village / City / Area Survey and preparation of report</p>	15
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Reference Books:

1. Acevedo, M. F., 2012. Data Analysis and Statistics for Geography, Environmental Science and Engineering, CRC Press.
2. Ahirrao, D. Y. and Karanjkehele, E.K., 2002. Pratyakshik Bhugol, Sudarshan Publication, Nashik.
3. Creswell J., 1994. Research Design: Qualitative and Quantitative Approaches, Sage Publications.
4. Dikshit, R. D., 2003. The Art and Science of Geography: Integrated Readings. Prentice-Hall of India, New Delhi.
5. Hammond, R. and McCullagh, P. S., 1977. Quantitative Techniques in Geography: An Introduction, Clarendon Press, Oxford.
6. Harris, R., Jarvis, C. 2011. Statistics for Geography and Environmental Science, Prentice Hall.
7. Jog. S. R. and Saptarshi, P. G., 1980. Sankhikhi Bhugol, Narendra Publication, Pune.
8. Karlekar, S. N. and Kale, M., 2006. Statistical Analysis of Geographical Data, Diamond Publication, Pune.
9. Kumbhar, A., 2000. Pratyakshik Bhugol, Sumeru Publications, Mumbai.
10. Mc Grew Jr., J. C., Lembo Jr., A. J., Monroe, C. B. 2014. An Introduction to Statistical Problem solving in Geography, 3rd ed, Waveland Press.
11. Pal. S. K., 1998. Statistical Methods for Geoscientists: Techniques and Applications, Concept Pub.co.
12. Robinson, A., 1998. "Thinking Straight and Writing That Way", in Writing Empirical Research Reports: A basic guide for students of the Social & Behavioral Sciences, eds. By F. Pryczak & R. Bruce Pryczak, Publishing, Los Angeles.
13. Rogerson, P. A., 2015. Statistical Methods for Geography: A Student's Guide, 4th ed, Sage.
14. Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan.
15. Singh R. L. and Dutt, P.K., 1968. Elements of Practical Geography, Students Friends, Allahabad.
16. Singh R. L., 2005. Elements of Practical Geography. Kalyani Publishers, New Delhi.
17. Stoddard, R. H., 1982. Field Techniques and Research Methods in Geography, Kendall/Hunt.
18. Wokcatt, H. 1995. The Art of Fieldwork, Alta Mira Press, Walnut Creek, CA.

3. B.Sc. Botany

a. Course Structure

CBCS: 2021-2022

T. Y. B. Sc.

Botany



Savitribai Phule Pune University

(Formerly University of Pune)

Three Year B.Sc. Degree Program in Botany

(Faculty of Science & Technology)

T.Y.B. Sc Botany

Choice Based Credit System Syllabus

To be implemented from Academic Year 2021- 2022

Title of the Course: B. Sc Botany**1. Structure of Course:**

Structure B.Sc. Botany syllabus					
Year	Semester	Course Type	Course code	Course Name	Credits
1	1	Compulsory Course	BO 111	Plant life and utilization I	2
			BO 112	Plant morphology and Anatomy	2
			BO 113	Practical based on BO 111 & BO 112	1.5
	2	Compulsory Course	BO 121	Plant life and utilization II	2
			BO 122	Principles of plant science	2
			BO 123	Practical based on BO 121 & BO 122	1.5
2	3	Compulsory Course	BO 231	Taxonomy of Angiosperms and Plant Ecology	2
			BO 232	Plant Physiology	2
			BO 233	Practical based on BO 231 & BO 232	2
	4	Compulsory Course	BO 241	Plant Anatomy and Embryology	2
			BO 242	Plant Biotechnology	2
			BO 243	Practical based on BO 241 & BO 242	2
3	5	Discipline Specific Elective Course	BO 351	Algae and Fungi	2
			BO 352	Archegoniate	2
			BO 353	Spermatophyta and Paleobotany	2
			BO 354	Plant Ecology	2
			BO 355	Cell and Molecular Biology	2
			BO 356	Genetics	2
			BO 357	Practical based on BO 351 & BO 352	2
			BO 358	Practical based on BO 353 & BO 354	2
			BO 359	Practical based on BO 355 & BO 356	2
			Skill Enhancement course	BO 3510	Medicinal Botany
	BO 3511	Plant Diversity and Human Health		2	
3	6	Discipline Specific Elective Course	BO 361	Plant Physiology	2
			BO 362	Biochemistry	2
			BO 363	Plant Pathology	2
			BO 364	Evolution and Population genetics	2
			BO 365	Advanced Plant Biotechnology	2
			BO 366	Plant Breeding and Seed Technology	2
			BO 367	Practical based on BO 361 & BO 362	2

CBCS: 2021-2022

T. Y. B. Sc.

Botany

			BO 368	Practical based on BO 363 & BO 364	2
			BO 369	Practical based on BO 365 & BO 366	2
		Skill Enhancement course	BO 3610	Nursery and Gardening Management	2
			BO 3611	Biofertilizers	2

2. Equivalence of Previous Syllabus:

Old Course (2015 Pattern)	New Course (2020 CBCS Pattern)
Semester V	Semester V
BO. 331 Cryptogamic Botany	BO 351 Algae and Fungi
BO. 332 Cell and Molecular Biology	BO 352 Archegoniate
BO. 333 Genetics and Evolution	BO 353 Spermatophyta and Paleobotany
BO. 334 Spermatophyta and Palaeobotany	BO 354 Plant Ecology
BO. 335 Horticulture and Floriculture	BO 355 Cell and Molecular Biology
BO. 336 Computational Botany	BO 356 Genetics
--	BO 3510 Medicinal Botany
--	BO 3511 Plant Diversity and Human Health
Semester VI	Semester VI
BO.341 Plant Physiology and Biochemistry	BO 361 Plant Physiology and Metabolism
BO.342 Plant Ecology and Biodiversity	BO 362 Biochemistry
BO.34 Plant Pathology	BO 363 Plant Pathology
BO.344 Medicinal and Economic Botany	BO 364 Evolution and population genetics
BO.345 Plant Biotechnology	BO 365 Advanced Plant Biotechnology
BO.346 Plant Breeding and Seed Technology	BO 366 Plant Breeding and Seed Technology
--	BO 3610 Nursery and Gardening Management
--	BO 3611 Biofertilizers

b. Course Syllabus

**T.Y.B.Sc. Botany CBCS Pattern
Practical (Semester V Paper VII) 2020-2021
BO 357: Practical based on BO351 and BO352 (2 Credits)**

Sr. No.	Title	No. of Practical
1.	Study of Algae with respect to systematic position, thallus structure and reproduction of <i>Nostoc</i> , <i>Oedogonium</i> , <i>Chara</i> , <i>Sargassum</i> , <i>Palmaria/Chondrus</i> .	04
2	Study of Fungi respect to systematic position, thallus structure and reproduction of <i>Mucor</i> , <i>Saccharomyces</i> , <i>Penicillium</i> , <i>Puccinia</i> and <i>Cercospora</i> .	04
3.	Study of <i>Marchantia</i> with respect to systematic position, morphology of thallus –rhizoids and scales, Gemma Cup, structure of sporophyte, reproduction.	01
4.	Study of <i>Anthoceros</i> with respect to systematic position, structure of gametophyte, anatomy of thallus, structure of Sporophytes, reproduction.	01
5	Study of <i>Funaria</i> with respect to systematic position, morphology of thallus- leaf, rhizoids, operculum, Anatomy of axis, leaf, reproduction	01
6	Study of Sporophyte evolution in Bryophytes with the help of permanent slides.	01
7	Study of <i>Psilotum</i> with respect to Taxonomic position, Morphology of sporophyte, anatomy and reproductive structure	01
8	Study of <i>Selaginella</i> with respect to Taxonomic position, Morphology of sporophyte, Anatomy and reproductive structures.	01
9	Study of <i>Equisetum</i> with respect to taxonomic position, Morphology of Sporophyte, anatomy and reproductive structure	01
10	Study of Stellar evolution in Pteridophytes with the help of permanent slides	01

Note: Botanical Excursion and submission of Tour Report with Photographs is compulsory.

**T.Y.B.Sc. Botany CBCS Pattern
Practical (Semester V Paper VIII) 2020-2021
BO 358: Practical based on BO353 and BO354 (2 Credits)**

Sr. No.	Title	No. of Practical
1.	Study of following families with reference to systematic position (following Bentham & Hooker), Diagnostic characters, floral formula, floral diagram of Nymphaeaceae, Oleaceae, Amaranthaceae, Cannaceae	04
2	Preparation of Botanical keys: Indented and bracketed keys by using vegetative and reproductive characters	01
3	Study of internal and external morphology of Gnetum	01
4.	Study of internal and external morphology of Pinus	01
5.	Study of the following with the help of slides and/ or specimens. i) Impression ii) Compression iii) Petrification	01
6	Study of polluted water body with ref. to BOD (D zero day and D fifth day).	02
7	Study of physicochemical properties of water body by using Sacchi disc, pH meter and electric conductivity meter	02
8	Acquisition of ecological data of particular locality by using GPS/ altimeter/geographic maps etc	02
9	Study of suitable ecosystem by line/belt transect method/ nested quadrat method	02

Note: Excursion tours of long and short duration are compulsory

4. B. Voc. RETM

a. Course Structure

Curriculum of Bachelor of Vocation (B. Voc.)

In

Renewable Energy Technology and Management

Designed by

Department of Skill Development



Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

NEW ARTS, COMMERCE AND SCIENCE COLLEGE, PARNER

DIST. AHMEDNAGAR -414302

Course Code	Course Title	Credit
SEMESTER - I		
	Theory Component	
RET-1-1	Introduction to Renewable Energy Sources	4
RET-1-2	Basics Electronics	4
RET-1-3	Basic Mechanical Engineering	4
	Skill Component	
REP-1-4	Practical – I (Based on Theory)	6
REP-1-5	Practical – II (On Job Training)	12
SEMESTER - II		
	Theory Component	
RET-2-1	Sustainable Development and Energy	4
RET-2-2	Applications of Solar Energy	4
RET-2-3	Bio-Energy	4
	Skill Component	
REP-2-4	Practical – III (Based on Theory)	6
REP-2-5	Practical – IV (On Job Training)	12
	Total Credits	60

Course Code	Course Title	Credit
SEMESTER - III		
	Theory Component	
RET-3-1	Soft Skills and Communications	4
RET-3-2	Rooftop and Wind Energy	4
RET-3-3	Solar Cell Technology & Its applications	4
	Skill Component	
REP-3-4	Practical – V (Based on Theory)	6
REP-3-5	Practical – VI (On Job Training)	12
SEMESTER – IV		
	Theory Component	
RET-4-1	Components of Photovoltaic Systems	4
RET-4-2	Solar Photovoltaic Systems: Design & Integration	4
RET-4-3	Solar Photovoltaic Systems: Installation & Maintenance	4
	Skill Component	
REP-4-4	Practical – VII (Based on Theory)	6
REP-4-5	Practical – VIII (On Job Training)	12
	Total Credits	60

Course Code	Course Title	Credit
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SEMESTER – V			
	Theory Component		
RET-5-1	Roof Top & Grid Connected PV System		4
RET-5-2	Net Metering Concept & Government Policies		4
RET-5-3	Introduction to PV Software's		4
	Skill Component		
REP-5-4	Practical – IX (Based on Theory)		6
REP-5-5	Practical – X(On Job Training)		12
SEMESTER – VI			
	Theory Component		
RET-6-1	Operation and Maintenance		4
RET-6-2	Feasibility Report		4
RET-6-3	Entrepreneurship Skills		4
	Skill Component		
REP-6-4	Practical – XI (Based on Theory)		6
REP-6-5	Practical – XII (On Job Training)		12
		Total Credits	60
STRUCTURE FOR SEMESTER			
Title	Credits	Hrs	Marks
Total No. of Theory courses = 3	12 (4 Credits each)	180	300
Total No. of Skill based courses = 3	18 (6 Credits each)	270	450
	30	450	750

STRUCTURE FOR SEMESTER			
Title	Credits	Hrs	Marks
Total No. of Theory courses = 3	12 (4 Credits each)	180	300
Total No. of Skill based courses = 3	18 (6 Credits each)	270	450
	30	450	750

b. Course Syllabus

Course Code: REP-2-5

**Course Title: Practical –IV (On Job Training)
credits)**

(12

Trainer Prerequisites for Job role:

Solar PV Installer Training Course (Suryamitra)SGJ/Q0101

Solar PV Engineer (Option: Solar Water Pumping Engineer) (SGJ/Q0112)

Solar PV Business Development Executive (SGJ/Q0107)

Solar PV Structural Design Engineer (SGJ/Q0109)

Solar PV Manufacturing Technician (SGJ/Q0119)

5. B. Voc. RETM

a. Course Structure

Curriculum of Bachelor of Vocation (B. Voc.)

In

Renewable Energy Technology and Management

Designed by

Department of Skill Development



Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

NEW ARTS, COMMERCE AND SCIENCE COLLEGE, PARNER

DIST. AHMEDNAGAR -414302

Course Code	Course Title	Credit
SEMESTER - I		
	Theory Component	
RET-1-1	Introduction to Renewable Energy Sources	4
RET-1-2	Basics Electronics	4
RET-1-3	Basic Mechanical Engineering	4
	Skill Component	
REP-1-4	Practical – I (Based on Theory)	6
REP-1-5	Practical – II (On Job Training)	12
SEMESTER - II		
	Theory Component	
RET-2-1	Sustainable Development and Energy	4
RET-2-2	Applications of Solar Energy	4
RET-2-3	Bio-Energy	4
	Skill Component	
REP-2-4	Practical – III (Based on Theory)	6
REP-2-5	Practical – IV (On Job Training)	12
	Total Credits	60

Course Code	Course Title	Credit
SEMESTER - III		
	Theory Component	
RET-3-1	Soft Skills and Communications	4
RET-3-2	Rooftop and Wind Energy	4
RET-3-3	Solar Cell Technology & Its applications	4
	Skill Component	
REP-3-4	Practical – V (Based on Theory)	6
REP-3-5	Practical – VI (On Job Training)	12
SEMESTER – IV		
	Theory Component	
RET-4-1	Components of Photovoltaic Systems	4
RET-4-2	Solar Photovoltaic Systems: Design & Integration	4
RET-4-3	Solar Photovoltaic Systems: Installation & Maintenance	4
	Skill Component	
REP-4-4	Practical – VII (Based on Theory)	6
REP-4-5	Practical – VIII (On Job Training)	12
	Total Credits	60

Course Code	Course Title	Credit
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SEMESTER – V			
	Theory Component		
RET-5-1	Roof Top & Grid Connected PV System		4
RET-5-2	Net Metering Concept & Government Policies		4
RET-5-3	Introduction to PV Software's		4
	Skill Component		
REP-5-4	Practical – IX (Based on Theory)		6
REP-5-5	Practical – X(On Job Training)		12
SEMESTER – VI			
	Theory Component		
RET-6-1	Operation and Maintenance		4
RET-6-2	Feasibility Report		4
RET-6-3	Entrepreneurship Skills		4
	Skill Component		
REP-6-4	Practical – XI (Based on Theory)		6
REP-6-5	Practical – XII (On Job Training)		12
		Total Credits	60
STRUCTURE FOR SEMESTER			
Title	Credits	Hrs	Marks
Total No. of Theory courses = 3	12 (4 Credits each)	180	300
Total No. of Skill based courses = 3	18 (6 Credits each)	270	450
	30	450	750

STRUCTURE FOR SEMESTER			
Title	Credits	Hrs	Marks
Total No. of Theory courses = 3	12 (4 Credits each)	180	300
Total No. of Skill based courses = 3	18 (6 Credits each)	270	450
	30	450	750

b. Course Syllabus

Course Code: REP-4-4 Practical – VII

(6 Credits)

Course Title: Practical Based on Theory

Sr. No.	Solar PV Practical's
1.	To demonstrate the I-V and PV characteristics of PV module with varying radiation and temperature level.
2.	To demonstrate the I-V and PV characteristics of series combination of PV module.
3.	To demonstrate the I-V and PV characteristics of parallel combination of PV module.
4.	To show the effect of variation in tilt angle on PV module power.
5.	To demonstrate the effect of shading on module output power.
6.	To demonstrate the working of diode as bypass diode.

Course Code: REP-4-5 Practical – VIII

(12 Credits)

Course Title: On Job Training

Work Report, Viva, Presentation, Industry Certificate.

1. Solar PV Project helper. SGJ/ Q0111
2. Solar site In-charge SGJ/Q0113
3. Solar PV maintenance Technician- Electrical (Ground mount) SGJ/Q0115
4. Solar PV maintenance Technician- Civil (Ground mount) SGJ/Q0116

6. M.A. /M.Sc. Geography

a. Course Structure

M.A./M. Sc. [I]

Geography



Savitribai Phule Pune University

(Formerly University of Pune)

Two Year Degree Program in Geography

(Faculty of Science & Technology)

Revised Syllabi for

M.A./M.Sc. (Geography) Part-I

(For Colleges Affiliated to Savitribai Phule Pune University)

Choice Based Credit System Syllabus

To be implemented from Academic Year 2019-2020

Title of the Course: M.A./M.Sc. (Geography)**Preamble****Introduction:**

Savitribai Phule Pune University has decided to change the syllabi of various faculties from June, 2019. Taking into consideration the rapid changes in science and technology and new approaches in different areas of Geography and related subjects, Board of Studies in Geography after a thorough discussion with the teachers of Geography from different colleges affiliated to the Savitribai Phule Pune University, Pune has prepared the syllabus of M.Sc./M. A. Semester - I and Semester- II (w.e.f. 2019-20) Geography course under the Choice Based Credit System (CBCS). The model curriculum as developed by U.G.C. is used as a guideline for the present syllabi.

Aims and Objectives of the new curriculum :

- i) To maintain updated curriculum.
- ii) To take care of fast development in the knowledge of Geography.
- iii) To enhance the quality and standards of Geography Education.
- iv) To provide a broad common frame work, for exchange, mobility and free dialogue across the Indian Geography and associated community.
- v) To create an aptitude for Geography in those students who show a promise for higher studies and creative work in Geography.
- vi) To create confidence in others, for equipping themselves with that part of Geography which is needed for various branches of Sciences or Humanities in which they have aptitude for higher studies and original work.

M.A./M. Sc. [I]

Geography

Structure of the Syllabus :**Semester – I**

Sr. No.	Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Core Compulsory Practical Paper (CCPP)	Credit
1	GGUT-111	Principles of Geomorphology	-	-	-	04
2	GGUT-112	Principles of Climatology	-	-	-	04
3	GGUT-113	Principles of Economic Geography	-	-	-	04
4			GGDT-114	Principles of Population and Settlement Geography	-	04
5					GGUP-115 Practical in Physical and Human Geography	04
					Total Credits of Semester I	20

M.A./M. Sc. [I]

Geography

Semester – II

Sr. No.	Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit
1	GGUT-121	Geoinformatics - I					04
One of the following according to specialization from CCTP							
2	GGUT-122	Coastal Geomorphology	-	-	04	-	04
	GGUT-123	Synoptic Climatology	-	-	04	-	
	GGUT-124	Agricultural Geography	-	-	04	-	
	GGUT-125	Population Geography	-	-	04	-	
One of the following according to specialization from CCTP							
3	GGUT-126	Fluvial Geomorphology	-	-	04	-	04
	GGUT-127	Monsoon Climatology	-	-	04	-	
	GGUT-128	Industrial Geography	-	-	04	-	
	GGUT-129	Geography of Rural Settlements	-	-	04	-	
Choice Based Optional Paper (CBOP) (1 Theory + 1 Practical)							
4			GGDT-130	Geography of Tourism	02		04
			GGDP-131	Practical in Surveying	02		
			GGDT-132	Geography of Disaster Management	02		
			GGDP-133	Practical in Map Projections	02		
Core Compulsory Practical Paper (CCPP)							
5						GGUP-134 Practical of Statistical Techniques for Geography	04
Total Credits of Semester - II							20

b. Course Syllabus

Semester I

Course: GGUP-115:Practical in Physical and Human Geography

Course Outcome:

1. Student gets acquainted with the basic techniques to be used in Geomorphology and Climatology.
2. Student gets acquainted with the basic techniques to be used in the fields of Economic and Population Geography.
3. Gain an insight in to the varied landforms and understand the process of their formation

No. of Credits: 04 No. of Periods: 60

Topic No.	Topic	Sub topics	Periods (3 hours)
A Geomorphology			
1	Drainage Network	Stream ordering and Bifurcation ratio i. Strahler's method ii. Horton's method	02
2	Drainage Basin Relief Analysis	Relief analysis (for a 3 to 5 order drainage basin; based on grid method) i. Absolute relief map ii. Relative relief map iii. Hypsometric analysis iv. Basin cross profiles v. Block diagram (multiple section)	03
B Climatology			
3	Climatic Element Diagrams	i. Climatograph ii. Climograph iii. Simple wind rose iv. Hythergraph v. Water Budget	03
4	Climatic Classification	i. Koppen's classification	02
C Economic Geography			
5	Crop Combination and Crop Diversification	i. Weaver's method ii. Jasbir Singh	02

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6	Measures of Network Structure	i. Ratio measure ii. Alpha, beta, gamma, etc. iii. Associated number, cyclomatic number	01
D Population and Settlement Geography			
7	Population Indices and Projection	i. Age-sex pyramid ii. Infant mortality rate iii. Population growth rate iv. Population projection	02
8	Measures of Nucleation and Dispersion	i. Rank size rule ii. Nearest neighbor analysis iii. Calculation of centrality	03
9	Field Visit and Report Writing	i. One day study tour or long tour of geographical interest places anywhere in the country and excursion report	02

Reference Books:

- **AsisSarkar (2015):** Practical Geography, A Systematic Approach, Orient Black Swan
- **Carter, H. (1977):** The study of Urban Geography, Edward Arnold, London.
- **Hans, R. (1978):** Fundamentals of Demography, Surjeet, Delhi.
- **Hudson F.S. (1976):** Geography of Settlements, Estover, Macdonald& Evans, England.
- **Liendsor, J.M. (1997):** Techniques in Human Geography, Routledge.
- **Lloyd, P. and Dicken, B. (1972):** Location in Space - A theoretical approach to economic geography, Harper and Row, New York.
- **Michael, E. and Hurse, E.(1974):** Transportation Geography, McGraw-Hill, New York.
- **Pollard, A.H. and FarhatYusu, (1974):** Demographic Techniques, Rushcutters Bay, N.S.W., Pergamon Press, Australia.
- **Singh, J. and Dhillon, (1984):** Agricultural Geography, Tata McGraw-Hill Publishing Company Limited, New Delhi.
- **Yeats, M.H. (1974):** An Introduction to Quantitative Analysis in Human Geography, McGraw-Hill, New York.

7. M.A. /M.Sc. Geography

a. Course Structure

M.A./M. Sc. [I]

Geography



Savitribai Phule Pune University

(Formerly University of Pune)

Two Year Degree Program in Geography

(Faculty of Science & Technology)

Revised Syllabi for

M.A./M.Sc. (Geography) Part-I

(For Colleges Affiliated to Savitribai Phule Pune University)

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- v) To create an aptitude for Geography in those students who show a promise for higher studies and creative work in Geography.
- vi) To create confidence in others, for equipping themselves with that part of Geography which is needed for various branches of Sciences or Humanities in which they have aptitude for higher studies and original work.

M.A./M. Sc. [I]

Geography

Structure of the Syllabus :**Semester – I**

Sr. No.	Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Core Compulsory Practical Paper (CCPP)	Credit
1	GGUT-111	Principles of Geomorphology	-	-	-	04
2	GGUT-112	Principles of Climatology	-	-	-	04
3	GGUT-113	Principles of Economic Geography	-	-	-	04
4			GGDT-114	Principles of Population and Settlement Geography	-	04
5					GGUP-115 Practical in Physical and Human Geography	04
					Total Credits of Semester I	20

M.A./M. Sc. [I]

Geography

Semester – II

Sr. No.	Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit
1	GGUT-121	Geoinformatics - I					04
One of the following according to specialization from CCTP							
2	GGUT-122	Coastal Geomorphology	-	-	04	-	04
	GGUT-123	Synoptic Climatology	-	-	04	-	
	GGUT-124	Agricultural Geography	-	-	04	-	
	GGUT-125	Population Geography	-	-	04	-	
One of the following according to specialization from CCTP							
3	GGUT-126	Fluvial Geomorphology	-	-	04	-	04
	GGUT-127	Monsoon Climatology	-	-	04	-	
	GGUT-128	Industrial Geography	-	-	04	-	
	GGUT-129	Geography of Rural Settlements	-	-	04	-	
Choice Based Optional Paper (CBOP) (1 Theory + 1 Practical)							
4			GGDT-130	Geography of Tourism	02		04
			GGDP-131	Practical in Surveying	02		
			GGDT-132	Geography of Disaster Management	02		
			GGDP-133	Practical in Map Projections	02		
Core Compulsory Practical Paper (CCPP)							
5						GGUP-134 Practical of Statistical Techniques for Geography	04
Total Credits of Semester - II							20

b. Course Syllabus

M.A./M. Sc. [I]

Geography

Course: GGUP-134:Practical of Statistical Techniques for Geography

Course Outcome:

1. To introduce the importance, applications of statistical techniques in geography.
2. To introduce and calculate statistical methods and its application.
3. To enable the students to understand central tendency.
4. To introduce the Probability and probability distribution.
5. To acquaint the students with the correlation and regression analysis.
6. To introduce the time series analysis, application, components and plotting.

No. of Credits: 04 No. of Periods: 60

Topic No.	Topic	Sub topics	Periods (3 hours)
1	Introduction to Statistical Techniques in Geography	i. Introduction and applications of statistical techniques in Geography ii. Types of statistics: descriptive and inferential statistics iii. Geographical data a) Primary and secondary data b) Spatial and temporal data c) Discrete and continuous data d) Grouped and ungrouped data iv. Scales of measurement: nominal, ordinal, interval and ratio	01
2	Descriptive Statistics	i. Introduction to descriptive statistics ii. Central tendency: mean, mode, median iii. Dispersion: variance and standard deviation iv. Skewness and kurtosis (Calculations of above parameters for ungrouped and grouped data)	03
3	Probability and Probability Distributions	i. Introduction to probability ii. The Normal Probability Distribution iii. The Binomial Probability Distribution iv. The Poisson Probability Distribution	03
4	Inferential Statistics	i. Introduction to inferential statistics ii. Population and sample iii. Hypothesis testing: Null and alternate hypothesis iv. The Chi-square test (Two sample case) v. Student's 't' test (Two sample tests) vi. ANOVA (Analysis of variance)/ F ratio test	05

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5	Correlation and Regression Analysis	i. Introduction to bi-variate correlation and regression ii. The product-moment correlation coefficient iii. Significance testing in correlation analysis iv. Linear regression equation v. Exponential regression equation vi. Power-law regression equation vii. Concept of residuals and explained variance	05
6	Time Series Analysis	i. Introduction and definition of time series ii. Applications of time series analysis iii. Components of time series iv. Calculation and plotting of moving averages (3 and 5) v. Curve fitting by method of least squares	02
7	Fieldwork and Data Collection	i. Collection of primary and/or secondary data by fieldwork or field visit ii. Analysis of data by using appropriate statistical technique(s) iii. Report writing	01

Reference Books:

- **AsisSarkar (2015):** Practical Geography, A Systematic Approach, Orient Black Swan
- **David, E. (1989):** Statistics for Geographers.
- **Elhance, D.L., Elhance, V. and Aggarwal B.M. (2014):** Fundamentals of Statistics, KitabMahal, Allahabad.
- **Hammond, R. and McCullagh, P. (1978):** Quantitative Techniques in Geography, Clarendon Press. Oxford, London.
- **Karlekar, S. and Kale, M. (2006):** Statistical Analysis of Geographical Data, Diamond Publication, Pune.
- **Liendsor, J. M. (1997):** Techniques in Human Geography, Routledge.
- **Norcliffe, G.B. (1977):** Inferential Statistics for Geographers, Hutchinson, London.
- **Rogerson, P.A. (2015):** Statistical Methods for Geography, SAGE Publication, London.
- **Wheller, D., Shaw, G. and Barr, S. (2010):** Statistical Techniques in Geographical Analysis, David Fulton, Routledge, New York.
- **Yeats, M. H. (1974):** An Introduction to Quantitative Analysis in Human Geography.

8. M.A. M.Sc. Geography

a. Course structure

M.A./M. Sc. [II]

Geography



Savitribai Phule Pune University

(Formerly University of Pune)

M.A./M.Sc.-II (Geography)

Choice Based Credit System Syllabus

To be implemented from Academic Year 2020-2021

M.A./M. Sc. [II]

Geography

Savitribai Phule Pune University
Faculty of Science and Technology
Geography MA/MSc – II
Semester – III

Course Code	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit
GGUT-235	Geoinformatics-II	-	-	04	-	04
GGUT-236	Geographical Thoughts	-	-	04	-	04
One of the following according to specialization from CCTP						
GGUT-237	Tropical Geomorphology	-	-	04	-	04
GGUT-238	Applied Climatology	-	-	04	-	
GGUT-239	Geography of Rural Development	-	-	04	-	
GGUT-240	Urban Geography	-	-	04	-	
Choice Based Optional Paper (CBOP) (1 Theory + 1 Practical)						
		GGDP-241	Practical in Geoinformatics	02	-	04
		GGUT-242	Hydrology	02	-	
		GGUT-243	Watershed Management	02	-	
		GGDP-244	Practical in Multivariate Statistics	02	-	
One of the following according to specialization from CCPP						
				GGUP-245	Practical in Geomorphology	04
				GGUP-246	Practical in Climatology	
				GGUP-247	Practical in Economic Geography	
				GGUP-248	Practical in Population and Settlement Geography	
Total Credits of Semester - III						20

M.A./M. Sc. [II]

Geography

Savitribai Phule Pune University
Faculty of Science and Technology
Geography MA/MSc – II
Semester - IV

	Core Compulsory Theory Paper (CCTP)	Choice Based Optional Paper (CBOP)	Theory / Practical	Credit	Core Compulsory Practical Paper (CCPP)	Credit
GGUT-249	Geography of India	-	-	-	-	04
GGUT-250	Oceanography	-	-	-	-	04
GGUT-251	Research Methodology	-	-	-	-	04
Choice Based Optional Paper (CBOP) (1Theory + 1Practical)						
		GGUT-252	Geography of Soils	02		04
		GGDP-253	Practical in Geostatistics	02		
		GGUT-254	Political Geography	02		
		GGUT-255	Regional Planning	02		
		GGDP-256	Practical in Watershed Analysis	02		
		GGDP-257	Interpretation of Topographical Maps and GPS Survey	02		
Core Compulsory Practical Paper (CCPP)						
				GGUT-258	Geography of World	04
				GGUP-259	Dissertation/ Research Project	04
Total Credits of Semester - IV						20

b. Course Syllabus**Savitribai Phule Pune University, Pune**

MA/MSc - II Syllabus in Geography (Credit System)

Revised Syllabus (from June, 2020)

Course: GGUP- 247 Practical in Economic Geography**Credit: 04****Periods: 60**

Topic No.	Topic	Subtopics	Practical (3 Hours)
1	Techniques in Agricultural Geography	i. Crop Combination: Thomas Method ii. Crop Diversification: Bhatia method iii. Crop Concentration : Jasbir Singh method iv. Measurement of Agriculture Efficiency : Kendall method v. Productivity Index: Enyedi Method vi. Cropping Intensity and Irrigation Intensity	05
2	Techniques in Industrial Geography	i. Lorenz Curve: Calculation and Plotting ii. Location Quotient: Calculation and Plotting iii. Gini's Co-efficient	04
3	Techniques in Trade and Transportation Geography	i. Measures in Network Structure: Ratio Measure, Alpha, Beta, Gamma, Associate Number and Cyclomatic numbers ii. Gravity Potential Population Surface iii. Breaking Point Theory iv. Law of Retail Trade Gravitation	05

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Geography

4	Cartographic Techniques in Economic Geography	i. Use of Thematic Maps in Economic Geography ii. Use of Choropleth Maps in Economic Geography iii. Use of GIS in Economic Geography	03
5	Industrial Visit	i. Visit to one Agro-based Unit (Industry) and report writing	03

Reference Books:

1. C. P. Lo and Albert, K. W. Yeung (2002): Concepts and Techniques of Geographic Information System, 2002Prentice –Hall, India.
2. Kansky, N. T. (1965): Structure of Transport Network
3. Liendsor, J. M. (1997): Techniques in Human Geography, Routledge
4. Lloyd, P. and B. Dicken (1972): Location in Space - A theoretical approach to economic geography. Harper and Row, New York.
5. Majid Hussein, “ Agricultural Geography”, Rawat Publication.
6. Monkhouse, F. J. and Wilkison, H. R. (1976): Map and Diagrams, Methuen and Co.
7. P. A. Burrough and R. A. McDonnell, (2000): Principles of Geographical Information System, Oxford University Press.
8. Paul A. Lonfley, Michel F. Goodchild, D J. Maguire and D.W. Rhind (2002): Introduction to Geographic Information Systems and Science, John Wiley and Sons Ltd.
9. Singh & Kanujia : Map work and Practical Geography
10. Singh. J. and Dhillon S.S. (1994): Agricultural Geography. Tata McGraw Hill, Publishing Co. Ltd.
11. Yeats, M. H. (1974): An introduction to Quantitative Analysis in Human Geography

9. M.Sc. Botany

a. Course Structure

M. Sc. [I]

Botany



Savitribai Phule Pune University

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Two Year Degree Program in Botany

(Faculty of Science & Technology)

Revised Syllabi for

M.Sc. (Botany) Part-I

(For Colleges Affiliated to Savitribai Phule Pune University)

Choice Based Credit System Syllabus

To be implemented from Academic Year 2019-2020

Structure for M. Sc. Botany First Year:

Year	Semester	Course Type	Course code	Course Name	Credits
1	1	Core Compulsory Theory paper	BOUT 111	Botany Theory Paper 1-Plant Systematics I	4
			BOUT 112	Botany Theory Paper 2- Cell Biology and Evolution	4
			BOUT 113	Botany Theory Paper 3- Cytogenetics and Plant Breeding	4
		Choice Based optional paper	BODT 114	Botany Theory Paper 4- a) Biofertilizer and Algal Technology OR b) Pomoculture and Fruit Processing Technology	2
			BODP 114	Botany Practical Paper 4-based on BO 114	2
		Core Compulsory practical paper	BOUP 115	Botany Practical Paper based on BOUT 111, BOUT 112 and BOUT 113	4
1	2	Core Compulsory Theory paper	BOUT 121	Botany Theory Paper 1-Plant Systematics II	4
			BOUT 122	Botany Theory Paper 2- Molecular Biology	4
			BOUT 123	Botany Theory Paper 3- Biochemistry	4
		Choice Based optional paper	BODT 124	Botany Theory Paper 4- a. Floriculture and Nursery Management OR b. Mushroom Cultivation and Biopesticide Technology	2
			BODP 124	Botany Practical paper 4- based on BODP 124	2
		Core Compulsory practical paper	BOUP 125	Botany Practical paper based on BOUT 121, BOUT 122 and BOUT 123	4

b. Course Syllabus

Semester I

BOUP 115: Botany practical paper based on BOUT 111, BOUT 112, and BOUT 113

Practical based on BOUT 111-Plant Systematics I

Practical on Algae:

1. Morphological observations, documentation (description and illustrations) and classification according to Fritsch (1935) with reasons of taxa belonging to:
 - a. Any one member from Charophyta, Euglenophyta, Basclariophyta and Chrysophyta, Cyanophyta. 1 P
 - b. Any three members from Phaeophyta, Chlorophyta and Rhodophyta. 2 P

Practical on Fungi:

2. Study of the representative genera belonging to following sub-divisions of fungi with respect to vegetative, reproductive structures and classification with reasons according to Ainsworth *et al* (1973).
 - a. Any one member from each Sub-divisions: Myxomycotina, Mastigomycotina and Zygomycotina 1P

M. Sc. [I]	Botany
b. Any three members of each Sub-divisions: Ascomycotina and Basidiomycotina and Deuteromycotina.	2P

Practical on Bryophytes:

3. Morphological, anatomical and reproductive studies of the following members:	
a. Any three members from Hepaticopsida and one member from Anthocerotopsida	1 P
b. Any four members from Bryopsida (Musci).	1 P

Practical based on BOUT 112: Cell Biology and Evolution

4. Study of mitosis and meiosis	2P
5. Study of polytene chromosome from Chironomous larvae	1P
6. Differential centrifugation for isolation of cell fractions- Nuclear fraction	1P
7. Isolation of Chloroplasts to study	1P
a. Hill reaction to measure intactness,	
b. Chlorophyll estimation	
8. Isolation of mitochondria for:	1p
a. Estimation of succinic dehydrogenase activity	
b. Microscopic observations using MitoTracker Green FM/ MitoTracker Red 580/ Janus green B	
9. Isolation of Lysosomal fraction and estimation of acid phosphatase activity	1P
10. Study of induced cell senescence in leaf discs & Study of programmed cell death in plants	1P
11. Study of different plant fossils & Geological Time Scale.	1P

Practical based on BOUT 113: Cytogenetics and Plant Breeding

12. Karyotype analysis, preparation of C- metaphase chromosomes of appropriate material (<i>Allium</i> / <i>Aloe</i>).	1P
13. Study of Meiotic configuration in <i>Rhoeo</i> buds	1P
14. Study of polygenic inheritance in any suitable material (Wheat/Maize etc.)	1P
15. Problems of population genetics: Estimation of gene and genotypic frequencies, PTC testing ability in humans	1P
16. Gene mapping, <i>Neurospora</i> tetrad analysis	1P
17. Problems on Mendelian Inheritance and analysis of F ₂ data by Chi-square Test.	1P
18. Study of Polytene / Salivary gland Chromosomes from <i>Drosophilla</i> / <i>Chironomous</i> larva, with Balbiani rings, puff balls, bands & inter bands.	1P
19. Floral Biology, Study of Pollen Viability (any two major crops). Use of Colchicine for induction of polyploidy in appropriate plant material.	1P

Note: Visit to different plant diversity regions and visit to any plant breeding centre. Submission of report is Compulsory.

Semester II
BODP 124: Practical based on BODT 124 Floriculture and Nursery Management

Practical (2 Credits):

1. Study of methods of post harvest technology for flowers (cut flowers) 1P
2. Study of different protective structures with respect to design, components, orientation and construction for cut flower production 1P
3. Study of special cultural practices for flower crops under protected structure 1P
4. Gerbera–identification and description of species/varieties – propagation and planting –pruning management 1P
5. Study of response of micronutrients and macronutrients on growth of cut flowers. 1P
6. Preparation of project on Cut flower production including diseases and Pests management. 1P
7. Preparation of Bed for nursery 1P
8. Study of different method of seed germination 2P
9. Preparation of growing media 1P
10. Study of Grafting and budding method 1P
11. Study of Air Layering and cutting method 1P

Note: Visit to any Local Nursery and Preparation of report is compulsory

10. M.Sc. Botany

a. Course Structure



Savitribai Phule Pune University

(Formerly University of Pune)

Two Year Degree Program in Botany

(Faculty of Science & Technology)

Revised Syllabi for

M.Sc. (Botany) Part-II

(For Colleges Affiliated to Savitribai Phule Pune University)

Choice Based Credit System Syllabus

To be implemented from Academic Year 2020-2021

Title of the Course: M.Sc. Botany

Structure for M. Sc. Botany Second Year:

Year	Semester	Course Type	Course code	Course Name	Credits
2	3	Core Compulsory Theory paper	BOUT 231	Botany Theory Paper 1- Computational Botany	4
			BOUT 232	Botany Theory Paper 2- Developmental Botany	4
			BOUT 233	Botany Theory Paper 3- Plant Physiology-	4
		Choice Based optional paper	BODT 234 (Any one)	Botany Theory Paper 4 a. Mycology b. Angiosperm Taxonomy- c. Plant Ecology d. Plant Biotechnology e. Genetics and Plant breeding f. Seed science	2
			BODP 234	Botany Practical Paper based on BODT 234	2
		Core Compulsory practical paper	BOUP 235	Botany Practical Paper based on BOUT 231, BOUT 232, BOUT 233	4
2	4	Core Compulsory Theory paper	BOUT 241	Botany Theory Paper 1- Botanical Techniques	4
			BOUT 242	Botany Theory Paper 2- Advanced Ecology	4
		Choice Based optional paper	BODT 243 (Any one)	Botany Theory Paper 3- a) Applied Mycology b) Advanced Medicinal Botany c) Advanced Plant Physiology d) Industrial Biotechnology- e) Seed Technology	2
			BODP 243	Botany Practical paper based on BODT 243	2
			BODT 244 (Any one)	Botany Theory Paper 4- a) Plant Tissue culture Technology b) Herbal Technology c) Research Methodology	2

			BODP 244	Botany Practical Paper based on BODT 244 Or PG Dissertation	2
		Core Compulsory practical paper	BOUP 245	Botany Practical paper based on BOUT 241 and BOUT 242	4

b. Course Syllabus**M. Sc II Botany Semester IV****BOUP 244 Botany Practical paper / PG Dissertation based on BOUP 244****BOUP 244 based on BODT 244 b) Herbal Technology (2Cr)**

Sr. No	Title of practical	No.
1	To perform preliminary phytochemical screening of crude drugs.	2
2	Determination of Ash value and moisture content of crude drugs	1
3	Determination of the alcohol content of Asava and Arista.	2
4	Preparation of any one herbal cosmetics.	2
5	Preparation and standardization of any oneherbal formulation.	2
6	Monograph analysis of herbal drugs from recent Pharmacopoeias	1
7	Analysis of fixed oils.	1

8	Study of different processes of packaging of dry,liquid and aromatic herbal products.	1
9	Market study of herbal products- cosmetics, medicines, nutraceuticals.	1
10	Visits to industry related to herbal products and quality testing centres related to herbal products.	2

M. Sc II Botany Practical Paper**BODP 234 Practical Paper based on BODT 234****BODP 234 based on BODT 234 d) Plant Biotechnology**

Sr. No	Title of practical	No.
1	Isolation of Plant genomic DNA using suitable method	2
2	Separation of restriction fragments using Agarose gel Electrophoresis	2
3	Enzymatic isolation of protoplast using suitable plant material	2
4	Evaluation and viability counting of the protoplasts	2
5	Physicochemical Properties of waste water	1
6	Biological assessment of waste water	1
7	Demonstration of Transgenic Plants	1
8	Visit to a Research institute and write a report on Biosafety	1
9	Visit To Commercial Tissue culture Laboratory and write a report	1
10	Visit to Waste water treatment Plant and write a report	1
11	Prepare a case study report on Patenting of any one Biotechnology Product/invention	1