Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2015

'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Meteorology (I. D. S.)

Name of the Course: B.Sc. II (Sem. –III & IV)

(Syllabus to be implemented from w. e. f. June 2020)

PunyashlokAhilyadeviHolkar Solapur University, Solapur

Faculty of Science & Technology

Choice Based Credit System (CBCS)

(w.e.f. June 2020)

Draft Structure for B. Sc-II Meteorology (I. D. S.)

Subject/ Core Course	Name and Type of the Paper		No. of papers/ Practical	Hrs/week			Total Marks Per Paper	UA	CA	Credits
		Name		L	T	P				
Class :	**B.Sc.- II**		**Semester – III**							
Core Subject (*Students can opt any Three subjects among the Four Subjects offered at B.Sc.I. Out of Three Subjects offered One Subject will be the Core Subject	C-5		Paper-V	3.0	--	--	50	40	10	4.0
			Paper-VI	3.0	--	--	50	40	10	
	C-6		Paper-V	3.0	--	--	50	40	10	4.0
			Paper-VI	3.0	--	--	50	40	10	
	C-7		Paper-V	3.0	--	--	50	40	10	4.0

OR									
		Paper-VI	3.0	--	--	50	40	10	
	SEC-1								
	GE-3								
Grand Total			**18**	--	--	**300**	**240**	**60**	**12**
Class :	**B.Sc.- II**		**Semester – IV**						
Core (*Students can opt any Three subjects among the Four Subjects offered at B.Sc.I. Out of Three Subjects offered One Subject will be the Core Subject	C-8	Paper-VII	3.0	--	--	50	40	10	4.0
		Paper-VIII	3.0	--	--	50	40	10	
	C-9	Paper-VII	3.0	--	--	50	40	10	4.0
		Paper-VIII	3.0	--	--	50	40	10	
OR Students can opt any Two subjects among the Four Subjects offered at B.Sc.I. Out of Two Subjects One Subject will be	C-10	Paper-VII	3.0	--	--	50	40	10	4. 0
		Paper-VIII	3.0	--	--	50	40	10	

the Core Subject and any One Subject among the other willbe Elective Subject									
	SEC-2								
	GE-4								
	Environmental Studies		3.0	--	--	50	40	10	NC
Total (Theory)			**21**	--	--	**350**	**280**	**70**	**12**
Practical	C-5 & C-8	Pr. III&IV	--	--	8	100	80	20	4.0
	C-6 & C-9	Pr. III&IV	--	--	8	100	80	20	4.0
	C-7 & C-10	Pr. III&IV	--	--	8	100	80	20	4.0
	GE-3 & GE-4								
Total (Practical)					**24**	**300**	**240**	**60**	**12**
Grand Total			**39**		**24**	**950**	**760**	**190**	**36**

***Core SubjectsChemistry/Physics/Electronics/Computer Science/Mathematics/Statistics/Botany/Zoology/**

Microbiology/Geology/ Geography/Psychology Core Subjects- (Additional)-Geochemistry/Biochemistry/ Meterology/Plant Protection

Summary of the Structure of B.Sc. Programme

as per CBCS pattern

Class	Semester	Marks-Theory	Credits-Theory	Marks-Practical	Credits-Practicals	Total – credits
B.Sc.-II	III	300	12	--	--	12
	IV	350	12	300	12	24
Total		650	24	300	12	36

B.Sc. Programme :

Total Marks : Theory + Practical's = 650 +300 =950

Credits : Theory + Practical's = 12 + 24 = 36

Numbers of Papers Theory: Ability Enhancement Course (AECC) : 00

Theory: Discipline Specific Elective Paper (DSE) : 00

Theory: CC : 06

Skill Enhancement Courses : 00

GE : 00

Total : Theory Papers :

: Practical Papers :

Abbreviations :

L: Lectures

T: Tutorials
P: Practicals
UA : University Assessment

CA : College Assessment

DSC / CC: Core Course

AEC : Ability Enhancement Course

DSE : Discipline Specific Elective Paper

SEC : Skill Enhancement Course

GE : Generic Elective

CA: Continuous Assessment

ESE: End Semester Examination

Course outcomes:

Student should learn:

1. **Basics of the Climate and Meteorology along with the practical applications**
2. **The principles underlying the different experiments.**
3. **Statistical data analysis tools and techniques.**
4. **Data collection and representation using Excel or power point Preparation.**
5. **Handling of meteorological instruments.**

Semester Pattern Syllabus

(w. e. f. June 2020)

N. B.:-

I. There will be **four** theory papers, each of 50 marks (40 UA+10 CA). (Papers I and II for third semester and Papers III and IV for fourth semester).

II. The practical examination will be annual.

III. The annual practical examination will be of 100 marks (Practical **I** 50 marks (40 UA+10 CA) & Practical **II** 50 marks (40 UA+10 CA).

IV. The total marks for Meteorology subject will be 300.

V. There shall be 3 theory periods per paper per week i.e. 6 theory periods per week for meteorology subject and 8 practical periods per week for each batch.

VI. The duration of theory examination for each paper will be 2 Hours each and that for practical will be 6 Hours for each practical.

VII. The practical examination will be for two days.

VIII. The theory examination of Papers I & II will be held at end of third semester.

IX. The theory examination of Papers III & IV will be held at end of fourth semester.

X. The practical examination of both semesters will be held at the end of fourth semester.

P. A. H. SOLAPUR UNIVERSITY, SOLAPUR

B. Sc. Part II SEMESTER III

Meteorology (I. D. S.)

Semester Pattern Syllabus

Paper I : Climatology

Total Marks: 50

Total Lectures: 45

Objectives

1. To acquaint the students with basic concept of Climatology.
2. Main objectives of the course are to synthesize with various factors of Climatology.

Unit No.	Name of the unit	Sub Units	Lectures
I	**Introduction of modern meteorology**	Climatology Introduction Nature, Scope, weather and climate and their element, Composition of atmosphere, Vertical structure of Earth's atmosphere, Climatology and meteorology.	**10**
II	**Global Circulation of the Atmosphere**	The General circulation primary, secondary, Tertiary circulation Tropical circulation, Circulation of Northern and Southern hemisphere	**10**
III	**Air masses and synoptic climatology**	Air masses definition, characteristics, source region classification air masses. Modification of air masses, Upper air circulation patterns, Jet streams	**10**
IV	**Atmospheric Disturbance**	Theories of the origin of cyclonic Depressions cyclone, Anticyclone- origin, stage, life cycle, thunderstorms, hurricane.	**10**
V	**Seasonal disturbances**	Reference to Indian monsoon	**05**

Reference Books

Sr No.	Name of the Book	Author
1	General Meteorology	H.R. Byeres Magraw Hill New York 1974
2	Meteorology	William L. Dorn
3	Climatology	Lal D.S. Prayag pustak Bhavan Allahabad.
4	Introduction to Meteorology	Pellersons
5	Climate and man Environment	Oliver J.E. John Weily and Sons New York
6	An Introduction to Climate	Triwartha G. T. Mc. Gray Hill Bk. New York 1968
7	Monsoon Meteorology	Sulochana Gadgil
8	Handbook of statistical methods in Meteorology	C. E. P. Brouks and N. Carrotners
9	Elementary Meteorology	G.F. Taylor
10	Ways of the Weather	P.A. Menon
11	Meteorology	D. Brun
12	Fundamentals of Meteorology.	V.C. finch G. T. Trewartha M.H. shearer F.L. caudle L.B. Bation
13	Climatology	Savindra Singh, Prayag pustak Bhavan Allahabad.
14	Physical Geography	Majid Hussain, Ravat publication Jaipur
15	Climatology	R. V. Rohli & A. J. Vega

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Choice Based Credit System w.e..f .June 2020
B.Sc. Part – II (Sem.III)
Subject: Meteorology (I. D. S.)
Name of the Paper - II: General Meteorology

Total Lectures: 45
Total Marks: 40 + 10 = 50
No of Credit: 2

Objectives

1. To acquaint the students with basic concept of general meteorology.
2. To understand physics behind atmospheric processes.

Unit No.	Name of the Unit	Sub Units	Lectures
1	Effects of atmosphere	1.1 Scattering, Reflection & Absorption of solar radiations 1.2 Effects of Scattering 1.3 Nature of radiations & Properties 1.4 Composition of earth's atmosphere **1.5** Green house effect.	9
2	The ozone layer	2.1Ozone (O_3) formation photochemical processes 2.2 Absorption of solar radiation by ozone 2.3 Depletion of ozone layer & ozone hole 2.4 Ozone (O_3) in Troposphere 2.5 Smog formation due to ozone. 2.6 Tephigram	9
3	Atmospheric motion	3.1 The pressure gradient force 3.2 Non-inertial frame of reference and pseudo forces 3.3 The Earth's rotational deflective force (Coriolis force) 3.4 Effects of Coriolis force in nature 3.5 Buys Ballot's law 3.6 The geostrophic wind 3.7 Local winds.	9
4	Satellite Meteorology	4.1 Satellite 4.2 Launching of satellite 4.3 Polar orbiting satellite 4.4 Geostationary satellites 4.5 Solar Cell 4.6 I-V Characteristics of Solar Cell.	9
5	Energy Science	5.1 Energy Science and energy technology 5.2 Various sciences and energy science 5.3 Energy , man and environment 5.4 Laws of conservation of energy 5.5 Energy demand	9

Reference Books:

Unit No.	Title	Author
1)	Climatology	A. A. Miller
2)	Introduction to meteorology	S. Petterson
3)	ATMOSPHERE, WEATHER AND CLIMATE	R. J. Barry & R. J. Chorley
4)	Energy Technology non conventional, Renewable and Conventional	S. Rao & B. B. Parulekar
5)	Environmental Science (Physical principles and applications)	Egbert Boeker & Rienk Van Grondelle.
6)	Climatology	R. V. Rohli & A. J. Vega

P. A. H. SOLAPUR UNIVERSITY, SOLAPUR
B. Sc. Part II
SEMESTER IV
Meteorology (I. D. S.)
Paper III: Applied Climatology

Total Marks: 50

Total Lectures: 45
Credits: 2

Objectives

1. To acquaint the students with basic concept of Applied Climatology.
2. Main objectives of the course are to synthesize with various factors of Applied Climatology.

Unit No.	Title	Sub Units	Lectures
I	**Weather and Health-Human response to climate**	The Physiological response, urban Climate, Climate and Health	**5**
II	**Climate and Human Activities**	Weather application to transportation, Agricultural activities, industry.	**10**
III	**Weather forecasting and analysis**	Historical back ground, types of Weather forecasting – short range, medium range, long range, weather forecasting method, weather modification, satellite studies in climatology.	**10**
IV	**Motion in the atmosphere**	Atmospheric pressure, pressure gradient, Coriolis effects, rotational forces, periodic local winds.	10
V	**Marine and Air operations**	Marine activities, Fishing, Offshore drilling, Telecommunications.	10

Reference Books

Sr	Name of the Book	Author
1	General Meteorology	R.H. Byeres, Magraw Hill New York 1974
2	Meteorology	William L. Dorn
3	Climatology	Lal D.S. Prayag pustak Bhavan Allahabad.
4	Introduction to Meteorology	Pellersons
5	Climate and man Environment	Oliver J.E. John Weily and Sons New York
6	An Introductiion to Climate	Triwarth G. T. Mc. Gray Hill Bk. New York 1968
7	Monsoon Meteorology	Sulochana Gadgil
8	Handbook of statistical method in	C. E. P. Brouks and N. Carrotners
9	Essentials of Meteorology	D.H. Mclntosh & A.S. Thom
10	Ways of the Weather	P.A. Menon
11	Meteorology	D. Brun
12	Fundamental of Meteorology.	V.C. finch G. T. Trewartha M.H. shearer F.L. caudle L.B. Bation
13	Climatology	Savindra Singh, Prayag pustak Bhavan Allahabad.
14	Physical Geography	Majid Hussain, Ravat publication Jaipur
15	Hobbs J.E.	Applied Climatology, Butterwortrth London 1980

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Choice Based Credit System w. e. f. June 2020
B. Sc. Part – II (Sem.IV)
Subject: - Meteorology (I. D. S.)
Name of the Paper - IV: Meteorological Instruments

Total Lectures: 45

Total Marks: 40 + 10 = 50

Credits: 2

Objective:

1. To acquaint the students with basic concept of meteorology.
2. To understand working and use of various meteorological Instruments.

Unit No.	Name of the Unit	**Sub Units**	Lectures
1	Rain measurement	1.1 Precipitation 1.2 Types of rain gauges (Classification) 1.3 Ordinary rain gauge 1.4 Self Recording rain gauge 1.5 The float gauge 1.6 Automatic siphon gauge.	9
2	Temperature Measurement	2.1 Temperature scales 2.2 Mercury Thermometer 2.3 Six' Thermometer 2.4 Thermograph	9
3	Pressure Measurement	3.1 Atmospheric pressure 3.2 Mercury barometer 3.3 Aneroid barometer 3.4 Barograph	9
4	Wind measurement	4.1 Wind 4.2 The wind vanes 4.3 Anemometers 4.4 Hooke's Anemometer 4.5 Cup Anemometer 4.6 Constants of Cup Anemometer 4.7 Anemogrpah	9
5	Humidity & Radiation measurement	5.1 Dry and Wet bulb Thermometers 5.2 Hair hygrometer 5.3 Ether Thermoscope 5.4 Crooke's Radiometer 5.5 Seebeck effect 5.6 Thermocouple 5.7 Thermopile 5.8 Radiation pyrometer.	9

Reference Books:-

Sr. No.	**Title**	**Author**
1)	METEOROLOGICAL INSTRUMENTS	W. E. KNOWLES MIDDLETON & ATHELSTAN F. SPILHAUS
2)	Energy Technology non conventional, Renewable and Conventional	S. Rao & B. B. Parulekar
3)	Environmental Science (Physical principles and application)	Egbert Bookers & Rienk Van Grondelle.
4)	ATMOSPHERE, WEATHER AND CLIMATE	R. J. Barry & R. J. Chorley
5)	METHODS OF ENVIRONMENTAL ANALYSIS OF WATER, SOIL & AIR	P. K. GUPTA

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B. Sc. Part II
Meteorology
(I.D.S.)
Semester Pattern Syllabus
Practical I
Meteorological Data Representation

I) Indian meteorological charts (IMD).
Isobaric patterns (drawing and identification) sign and symbols on IMD charts, interpretation of IMD charts (Pre monsoon, monsoon, post monsoon), description of pressure, wind, sky condition, precipitation, Departure of pressure and temperature, Beaufort (Scale) Notation.

II) Role of GIS and Remote Sensing in Meteorology.

III) Representation of Meteorological data Graphs – line Graph, Bar Graph, Climograph, Histograph, Hythergraph, Crop calendar.
Diagrams- star diagram, wind rose, Octagonal wind rose.

IV) Statistical analysis using climatic data ,Measures of central tendency, measure of dispersion, frequency distribution, climatic trends.

V) Field visit / data collection / project.

VI) Journal

Reference Books:

Sr.	Title	Author
1	Essential of meteorology	D.H. Mclntosh and A.S. Thom.
2	Ways of the weather	P.A. Menon
3	Weather and Man	H.H. Neuberger, F.B. Stephens (A/c No. 2023)
4	Meteorology	D.Brune
5	Elementary meteorology	V.C. Finch, G.T. Trewartha, M.H. Shearer, F.C.
6	Meteorology	W.C. Dorn
7	Monsoon meteorology	SulochanaGadgil
8	Fundamentals of meteorology Application	L.B. Battan
9.	Remote sensing and image interpretation, John Willey & Sons New York	Lillesand I. M. and kiefer R. W. (1979):
10	Advanced practical Geography	Pijushkanti Saha, Partha Basu, Allied ltd. Publication, Kolkata
11	Element of Practical Geography	R.L. Singh

Practical II: Study of Meteorological Instruments (w.e.f June 2020)
List of Experiments

Sr. No.	Title of the Experiment
1	Rain gauge.
2	Mercury Thermometer
3	Six's Thermometer
4	Thermograph.
5	Pressure gradient & Coriolis parameter
6	Fortin's barometer.
7	Barograph
8	Aneroid Barometer
9	Cup anemometer
10	Hair hygrometer.
11	Wet & dry bulb thermometer.
12	Ether thermoscope.
13	Crooke's radiometer
14	Characteristics of photovoltaic cell
15	Field visit / data collection / project.
16	Journal

Reference Books:

Sr. No.	Title	Author	Publication	Edition
1	METEOROLOGICAL INSTRUMENTS	W. E. KNOWLES MIDDLETON & ATHELSTAN F. SPILHAUS	UNIVERSITY OF TORONTO PRESS	3
2	Energy Technology non conventional, Renewable and Conventional	S. Rao & B. B. Parulekar	Khanna Publishers	3
3	Environmental Science (Physical principles and application)	Egbert Bookers & Rienk Van Grondelle.		
4	Monsoon meteorology	Sulochana Gadgil		
5	METHODS OF ENVIRONMENTAL ANALYSIS OF WATER, SOIL & AIR	P. K. GUPTA		

Equivalent papers:

Old Papers (CBCS 2017)	**New Papers (CBCS 2020)**
Climatology	Climatology
General Meteorology	General Meteorology
Applied Climatology	Applied Climatology
Meteorological Instruments	Meteorological Instruments
Practical I	Practical I: Meteorological Data Representation
Practical II	Practical II: Study of Meteorological Instruments