SATPUDA EDUCATION SOCIETY, JALGAON JAMOD'S
Arts & Commerce College
Warwat Bakal Tq. Sangrampur Dist - Buldhana (M.S.)
NAAC Reaccredited with 'B' Grade
- Principal -
Dr. Shriram Yerankar
M.A., M.Phil, Ph.D.
9423722316
College Code : 327
- President -
Shri. Krushnarao Ingle
(Ex. M.L.A.)
07266-221449
Website : www.acscwb.co.in
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1.1 Curriculum Planning and Implementation

Session-2022-2023

Supporting Documents-A

1.1.1 Effective curriculum delivery through a well-planned and documented process

Metric No.	Sr. No.	Content / File Description	Document Link
1.1.2.	B	Adherence to Academic Calendar for Continuous Internal Evaluation (CIE)	

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CERTIFICATE

This is to certify that the documents attached as supporting documents for Criterion I: Curricular Aspects are verified from the college record and found to be correct to the best of my knowledge.

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SATPUDA EDUCATION SOCIETY, JALGAON (JAMOD)'S

ARTS & COMMERCE COLLEGE

WARVAT BAKAL DIST- BULDANA

DEPARTMENT OF CHEMISTRY

DEPRTMENTAL ACADEMIC CALENDAR 2022-23

ARTS AND COMMERCE COLLEGE

Warvat Bakal Dist.- Buldana

Department of Chemistry

Perspective Plan for Curriculum Implementation 2022-2023

	B.Sc.- Part I SEM I		
Sr. No.	**Unit**	**Available Lectures**	**Duration**
1	Periodicity of elements	14 Lectures	July 2022 to November 2022
2	Acids and bases	14 Lectures	July 2022 to November 2022
3	Basics of organic chemistry	14 Lectures	July 2022 to November 2022
4	Aromatic hydrocarbons	14 Lectures	July 2022 to November 2022
5	Gaseous state	14 Lectures	July 2022 to November 2022
6	Liquid state	14 Lectures	July 2022 to November 2022
	B.Sc.- Part II SEM III		
Sr. No.	**Unit**	**Available Lectures**	**Duration**
1	Ionic bonding	14 Lectures	July 2022 to November 2022
2	VSEPR theory, MOT	14 Lectures	July 2022 to November 2022
3	Haloalkanes and Haloarenes	14 Lectures	July 2022 to November 2022
4	Phenols	14 Lectures	July 2022 to November 2022
5	Crystalline state	14 Lectures	July 2022 to November 2022
6	Chemical kinetics	14 Lectures	July 2022 to November 2022
	B.Sc.- Part III SEM V		
Sr. No.	**Unit**	**Available Lectures**	**Duration**
1	Coordination compounds -1	14 Lectures	July 2022 to November 2022
2	Coordination compounds-2	14 Lectures	July 2022 to November 2022
3	Heterocyclic compounds	14 Lectures	July 2022 to November 2022
4	Dyes drugs and pesticides	14 Lectures	July 2022 to November 2022
5	Photochemistry	14 Lectures	July 2022 to November 2022
6	Molecular spectroscopy	14 Lectures	July 2022 to November 2022
	B.Sc.-Part I SEM II		
Sr. No.	**Unit**	**Available Lectures**	**Duration**
1	Polarization	14 Lectures	January 2023 to May 2023
2	P- block elements & nonaqueous solvents	14 Lectures	January 2023 to May 2023
3	Alkyl halides	14 Lectures	January 2023 to May 2023
4	Phenols, ethers and epoxides	14 Lectures	January 2023 to May 2023
5	Physical properties & molecular structure	14 Lectures	January 2023 to May 2023
6	Chemical kinetics	14 Lectures	January 2023 to May 2023
	B.Sc.- Part II SEM IV		
Sr. No.	**Unit**	**Available Lectures**	**Duration**
1	Chemistry of transition series elements	14 Lectures	January 2023 to May 2023
2	Inner transition series elements	14 Lectures	January 2023 to May 2023
3	Polynuclear hydrocarbons	14 Lectures	January 2023 to May 2023
4	Aromatic nitro compounds	14 Lectures	January 2023 to May 2023
5	Colligative properties of dilute solutions	14 Lectures	January 2023 to May 2023
6	Crystalline state	14 Lectures	January 2023 to May 2023
	B.Sc.-Part I SEM VI		
Sr. No.	**Unit**	**Available Lectures**	**Duration**
1	Kinetic aspects of metal complexes	14 Lectures	January 2023 to May 2023
2	Organometallic chemistry	14 Lectures	

3	Electronic spectroscopy & IR Spectroscopy	14 Lectures	January 2023 to May 2023
4	NMR and mass spectroscopy	14 Lectures	January 2023 to May 2023
5	Elementary quantum mechanics	14 Lectures	January 2023 to May 2023
6	Electrochemistry and nuclear chemistry	14 Lectures	January 2023 to May 2023

Perspective Plan for Co-curricular Activities 2020-21

Sr. No.	Particulars	Date
01	Chemistry Study Circle Inauguration	10/08/2022
02	Guest Lecture	05/09/2022
03	Seminar Competition	19/09/2022
04	Industrial Tour	10/10/2022
06	National Science Day	28/02/2023
07		
08		

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ARTS & COMMERCE COLLEGE, WARVAT BAKAL

Department of Chemistry

ACADEMIC CALENDER 2022-2023

1. Session- I: From Friday, 1st July, 2022 to Wednesday, 30th November, 2022
2. Diwali Vacation: From Monday, 24th October, 2022 to Tuesday, 8th November, 2022
3. Session- II: Friday, 1st July, 2022 to Wednesday, 30th November, 2022
4. Summer Vacation: Monday, 23rd January, 2023 to Saturday, 15th May, 2023

Days available during Academic Year 2022-2023

Sr. No.	Activity	Commencement	Cessation	Total Days
1	First Session %	Friday, 1st July, 2022	Wednesday, 30th November, 2022	110
2	Teaching Days (First Session)	Monday, 25th July, 2022	Saturday, 22nd October, 2022	71
		Wednesday, 9th November, 2022	Wednesday, 30th November, 2022	19
3.	First Term Vacation	Monday, 24th October, 2022	Tuesday, 8th November, 2022	16
4.	Non-instructional days	Thursday,1st December, 2022	Saturday, 21st January, 2023	07
5.	Second Session	Monday, 23rd January, 2023	Saturday, 27th May, 2023	98
6.	Teaching Days (Second Session)	Wednesday, 1st February, 2023	Saturday, 27th May, 2023	91
7.	Preparation for Summer Examination/ Non Instructional Days	Monday, 29th May, 2023	Saturday, 1st July, 2023	29
8.	Second Term Vacation	Monday, 29th May, 2023	Saturday, 1st July, 2023	34

ARTS & COMMERCE COLLEGE, WARVAT BAKAL

Department of Chemistry

Vide the SGB Amravati University Gazette, following Public Holidays are declared for 2022-2023

अ. क्र. (Sr.No.)	सण/सुट्या (Festivals/Holidays)	दिवस व दिनांक (Day & Date)
१.	मोहरम Moharum	मंगळवार, दि. ९ ऑगस्ट, २०२२ Tuesday, 9th August, 2022
२.	रक्षाबंधन Rakshabandhan	गुरुवार, दि. ११ ऑगस्ट, २०२२ Thursday, 11th August, 2022
३.	स्वातंत्र्य दिन Independence Day	सोमवार, दि. १५ ऑगस्ट, २०२२ Monday, 15th August, 2022
४.	पारशी नूतनवर्ष (शहेनशाही) Parsi New Year (Shahenshahi)	मंगळवार, दि. १६ ऑगस्ट, २०२२ Tuesday, 16th August, 2022
५.	श्रीगणेश चतुर्थी ShriGanesh Chaturthi	बुधवार, दि. ३१ ऑगस्ट, २०२२ Wednesday, 31st August, 2022
६.	अनंत चतुर्दशी Anant Chaturdashi	शुक्रवार, दि. ९ सप्टेंबर, २०२२ Friday, 9th September, 2022
७.	दसरा Dasara	बुधवार, दि. ५ ऑक्टोबर, २०२२ Wednesday, 5th October, 2022

८.	प्रजासत्ताक दिन Republic Day	गुरुवार, दि. २६ जानेवारी, २०२३ Thursday, 26th January, 2023
९.	महाशिवरात्री Mahashivratri	शनिवार, दि. १८ फेब्रुवारी, २०२३ Saturday, 18th February, 2023
१०.	होळी (दुसरा दिवस) Holi (Second Day)	मंगळवार, दि. ७ मार्च, २०२३ Tuesday, 7th March, 2023
११.	गुढीपाडवा Gudhi Padwa	बुधवार, दि. २२ मार्च, २०२३ Wednesday, 22nd March, 2023
१२.	श्रीराम नवमी Shriram Navmi	गुरुवार, दि. ३० मार्च, २०२३ Thursday, 30th March, 2023
१३.	महावीर जयंती Mahavir Jayanti	मंगळवार, दि. ४ एप्रिल, २०२३ Tuesday, 4th April, 2023
१४.	गुड फ्रायडे Good Friday	शुक्रवार, दि. ७ एप्रिल, २०२३ Friday, 7th April, 2023
१५.	डॉ.बाबासाहेब आंबेडकर जयंती Dr.Babasaheb Ambedkar Jayanti	शुक्रवार, दि. १४ एप्रिल, २०२३ Friday, 14th April, 2023
१६.	रमझान ईद (ईद-उल-फितर) Ramzan Id (Id-Ul-Fitar)	शनिवार, दि. २२ एप्रिल, २०२३ Saturday, 22nd April, 2023
१७.	महाराष्ट्र दिन Maharashtra Day	सोमवार, दि. १ मे, २०२३ Monday, 1st May, 2023
१८.	बुध्द पौर्णिमा Buddha Pournima	शुक्रवार, दि. ५ मे, २०२३ Friday, 5th May, 2023

PROGRAMS SCHEDULE (2022-2023)

Sr. No.	Particulars	Date	Name of Teacher
01	Chemistry Study Circle Inauguration	10/08/2022	Prof. N.D. Dahake
02	Guest Lecture	05/09/2022	Dr. V.D. Ingale
03	Seminar Competition	19/09/2022	Prof. N.S. Shelke
04	Industrial Tour	10/10/2022	Prof. K.P. Sabale
05	National Science Day	28/02/2023	Common to All Department

Mr. N. D. Dahake
HOD

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Time Table (Odd sem)

1) **Mr. Nityanand Devidas Dahake**

Faculty: Science **Subject: Chemistry**

Period	1	2	3	4	5	6	7	8	9
Day / Time	8:00 to 8:48 (P)	8:48 to 9:36 (P)	9.36 to 10:24 (P)	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	2:30 to 3:18 (P)	3:18 to 4:6 (P)	3: to 4:54 (P)
MON	P	P	P			T			
TUE	P	P	P		T				
WED	P	P	P				P	P	P
THUS	P	P	P		T		P	P	P
FRI	P	P	P				P	P	P
Day / Time				07:30 To 08.18	08:18To 09:06	09:06 To 09.54	10.04 to 12.52 To 12.52 to 3.06		
SAT				T			P	P	P

Allotted Workload

Subject: Chemistry Year: 2022-2023

Sr. No.	Class	No. of periods per week			Paper Allotted
		Lectures	Tutorials	Practical	
1	B.Sc.-1	03	--	12	--
2	B.Sc.-2	01	--	06	--
3	B.Sc.-3	--	--	12	--
4	M.Sc.-1	01	--	--	--

Total Workload per week (L+P): 05 (L) +30 (P) = 35 (L) (28 hrs.)

Time Table (Even sem)

1) Mr. Nityanand Devidas Dahake

Faculty: Science **Subject: Chemistry**

Period	1	2	3	4	5	6	7	8	9
Day / Time	8:00 to 8:48 (P)	8:48 to 9:36 (P)	9.36 to 10:24 (P)	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	2:30 to 3:18 (P)	3:18 to 4:6 (P)	3: to 4:54 (P)
MON	P	P	P			T			
TUE	P	P	P		T				
WED	P	P	P		T		P	P	P
THUS	P	P	P		T		P	P	P
FRI	P	P	P				P	P	P
Day / Time				07:30 To 08.18	08:18To 09:06	09:06 To 09.54	10.04 to 12.52 To 12.52 to 3.06		
SAT							P	P	P
SUN	P	P	P		T		P	P	P

Allotted Workload

Subject: Chemistry Year: 2022-2023

Sr. No.	Class	No. of periods per week			Paper Allotted
		Lectures	Tutorials	Practical	
1	B.Sc.-1	02	--	12	--
2	B.Sc.-2	01	--	06	--
3	B.Sc.-3	01	--	12	--
4	M.Sc.-1	01	--	--	

Total Workload per week (L+P): 05 (L) + 30 (P) = 35 (L) (28 hrs.)

Available Teaching days in 2022-23

Odd SEM teaching Days (83): 25/07/2022 to 22/10/2022 = 71

and

09/11/2022 to 30/11/2022=19

Even SEM Teaching Days (90): 01/02/2023 to 15/05/2023 = **91**

	JUL-22	AUG-22	SEP-22	OCT-22	NOV-22	FEB-23	MAR-23	APR-23	MAY-23
MON	01	04	04	03	03	04	04	04	03
TUE	01	03	04	03	03	04	03	03	04
WED	01	04	04	02	04	04	04	04	04
THUS	01	03	05	03	03	04	04	04	04
FRI	01	04	04	03	03	04	05	02	03
SAT	01	04	04	04	03	03	04	04	04
Total	06	22	25	18	19	23	24	21	22
	90					**90**			

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Teaching Periods Available per month during the session 2022-2023

Faculty: Science **Subject: Chemistry**

Semester		Odd semester						Even semester				
Months		July	Aug	Sep	Oct	Nov	Total	Feb	Mar	Apr	May	Total
B.Sc.-1	Theory	03	11	12	10	09	45	08	07	07	07	29
	Practical	12	48	48	42	36	186	42	54	36	42	174
B.Sc.-2	Theory	01	03	05	03	03	15	04	04	04	04	16
	Practical	06	14	16	12	12	50	16	14	14	14	58
B.Sc.-3	Theory	00	00	00	00	00	00	04	04	04	04	16
	Practical	12	42	54	30	42	180	48	48	48	48	192
M.Sc. - 1	Theory	01	03	05	03	03	15	04	04	04	04	16
	Practical	00	00	00	00	00	00	00	00	00	00	00

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Teaching Plan for Theory (First Semester) Class: BSc Part-I			
Sr. No.	**Topic to be covered**	**Lectures Available**	**Lectures Utilized**
Unit-3 Basics of Organic Chemistry			
	A) Electronic Displacement and Reactive Intermediates: Inductive, Electromeric, Resonance, Mesomeric effects, Hyperconjugation and their applications, dipole moment, homolytic and heterolytic fission with suitable examples. Electrophiles and nucleophiles. Types, shape and their relative stability of carbocations, carbanions, free radicals and carbenes and nitrene B) Aliphatic Hydrocarbons: Formation and reaction of alkanes, Formation of alkenes and alkynes by elimination reactions (with mechanism of E1, E2, E1cb), Saytzeff and Hofmann eliminations, Reactions of alkenes and alkynes, Diels-Alder reaction. C) Structural isomers: Definition, classification, and examples.	45	
Unit-4 Aromatic Compound			
	A) Structural Properties: Aromaticity and Huckel's rule (Benzenoid and Non Benzenoid compounds), Kekule and Dewar structures, Molecular orbital diagram of benzene, Anti-aromatic and non-aromatic compounds. B) Orientation effect: Effect of substituent groups, Activating and deactivating group, Theory of reactivity and orientation on the basis of inductive and resonance effects. C) Electrophilic aromatic substitution: Halogenation, nitration, Sulphonation and Friedel Craft's alkylation/acylation with their mechanism.		
Unit-5 Gaseous State:			
	Postulates of kinetic theory of gases, Maxwell-Boltzmann distribution of velocities (only qualitative treatment), RMS velocity, Average velocity, most probable velocity, Relationship between RMS velocity and Average velocity, RMS velocity and Most probable velocity, Mean free path, Collision diameter, Collision number or Collision frequency, Deviation of real gases from ideal behavior, Explanation of deviations, Derivation of van der Waal's equation for real gases. Critical phenomenon, Andrew's experiment (isotherms		

	of carbon dioxide) Critical constant Pc, Tc, Vc in terms of van der Waal's constant (a, b) Derivation of reduced equation of state, Law of corresponding state, Numerical.		

Teaching Plan for Practical (First Semester)

Class: BSc Part-I

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	1. Preparation of Acetyl derivative of aromatic primary amine (aniline or toluidine). 2. Preparation of Benzanilide (Benzoylation). 3. Preparation of Benzoic acid from Benzamide (Hydrolysis). 4. Preparation of Benzoic acid from benzaldehyde (Oxidation). 5. Preparation of phenyl–azo–β–naphthol dye (Diazotization) 6. Base catalyzed Aldol Condensation (Synthesis of dibenzyl propanone). 7. Preparation of p-nitro acetanilide from acetanilide. 8. Determination of surface tension of a given liquid using Stalagmometer 9. Determination of the parachor value of -CH2- group (methylene) using Stalagmometer 10. Determination of coefficient of viscosity of aqueous solution of ethanol or polymer at room temperature 11. Determination of unknown percentage composition of given glycerol solution from standard 2%, 4%,6%,8% and 10% solutions of glycerol 12. Determination of the heat of solution of KNO3 (5% solution)	186	

Teaching Plan for Theory (Third Semester)

Class: BSc Part-2

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
Unit-6 Liquid State and Electrochemistry			
	A] Liquid state: (i) Surface tension, determination and its S.I. Unit. Effect of temperature on surface tension, derivation of expression for relative surface tension by Drop number method. Application of surface tension. (ii) Viscosity, determination and its S.I. Unit. Effect of temperature on viscosity, derivation of expression for	15	

	relative viscosity by Ostwald's viscometer method. Applications of viscosity. B] Electrochemistry: (i) Conductance of electrolyte solution. Specific, equivalent and molar conductance. Determination of conductance of electrolyte solution, variation of specific and equivalent conductance with dilution for strong electrolyte. Conductometric titrations. Applications of conductometric titration. (ii) Migration of ions under the influence of electric field. Transport number of ions. Determination of transport number by Hottorf's method and Moving boundary method (iii) Kohlrausch's law of independent migration of ions. Determination of ⅈ¥ and degree of dissociation a of a weak electrolyte. Determination of dissociation constant of weak electrolyte. (iv) Numerical.		
Teaching Plan for Practical (Third Semester)			
Class: BSc Part-2			
	Exercise I: a) Volumetric Analysis (Standard solutions to be prepared by students only) 16 Laboratory sessions 1) Prepare 0.1N oxalic acid standard solution and find out the acid neutralizing capacity of an antacid using NaOH as an intermediate solution. 2) Prepare 0.1N H2SO4 solution and find out its exact normality using NaOH as an intermediate solution and 0.1N oxalic acid as standard solution. 3) To determine the strength of oxalic acid by titration with KMnO4. 4) To determine percentage purity of Ferrous Ammonium Sulphate (FAS) by titration with KMnO4. 5) To determine strength of FAS by titration with K2Cr2O7 using internal indicator. 6) To determine strength of K2Cr2O7 by titration with FAS using internal indicator. 7) Estimation of copper (II) in commercial copper sulphate sample by iodometric titration. b) Gravimetric Analysis Estimation of Ba2+ as BaSO4, Fe3+ as Fe2O3 using China and silica crucible and Ni2+ as Ni-DMG using sintered glass crucible. Exercise II: Physical Chemistry experiments 1) To determine refractive index by Abbe's refractometer. 2) To construct phase diagram of phenol-water	50	

	system and to determine consolute temperature for the system. 3) To determine transition temperature of MnCl2.4H2O. 4) To study kinetics of hydrolysis of methyl acetate catalyzed by acid. 5) To study kinetics of saponification of ethyl acetate by NaOH. (Equal concentration) 6) To determine partition coefficient of benzoic acid between benzene and water. 7) To determine partition coefficient of iodine between CCl4/Kerosene and water. 8) To determine solubility of benzoic acid at different temperature and heat of solution.		

Teaching Plan for Theory (Fifth Semester)

Class: BSc Part-3

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
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Teaching Plan for Practical (Fifth Semester)

Class: BSc Part-3

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	Exercise 1: Inorganic Preparations 12 Laboratory sessions 1. Preparation of tetraamminecopper (II)sulphate. 2. Preparation of hexaamminenickel (II)chloride. 3. Preparation of potassiumtrioxalate aluminate (III). 4. Preparation of Prussian blue. 5. Preparation of chrome alum. 6. Preparation of sodium thiosulphate and dithionite. (Comment on VB structure, magnetic properties and color of 1, 2 and 3 complexes) Exercise II: Physical Chemistry experiments 14 Laboratory sessions (Standard oxalic acid solution should be prepared by the students) 1. To determine strength of given HCl solution conductometrically. 2. To determine strength of given CH3COOH solution conductometrically.		

	3. To determine strength of given HCl solution potentiometrically. 4. To determine strength of HCl and CH3COOH in a given mixture conductometrically. 5. To determine redox potential of Fe+2/Fe+3 system potentiometrically. 6. To determine molecular weight by Rast's method. 7. To determine specific rotation of optically active compound by Polarimeter		

Teaching Plan for Theory (Second Semester)

Class: BSc Part-1

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
Unit 1			
	A) Ionic bonding: Definition of ionic bond. Factors affecting ionic bond formation (energetic of ionic bond formation ionization energy, electron affinity and lattice energy). Born-Haber's cycle to determine lattice energy. Solvation and solvation energy, factors affecting solvation energy. B) Polarization: Definition, polarizing power, polarizability, effect of polarization on nature of bond. Fajan's rules of polarization and its applications. C) Valence bond theory: Directional nature of covalent bond. Hybridization, types of hybridization to explain geometries of BeCl2, BF3, CH4, PCl5, SF6 and IF7	29	
Unit 4			
	A) Phenols: Phenol - Synthesis from toluene, cumene and salicylic acid, Kolbe's carboxylation reaction, Fries rearrangement, Reimer-Tiemann reaction, bromination, acidity of phenol. B) Ethers and epoxides: Diethyl ether - Synthesis from ethanol, Williamson's synthesis, reactions with cold and hot HI and acetic anhydride. Crown ethers - Brief introduction to crown ethers and its applications. Ethylene oxide - Synthesis from ethylene, ring opening reactions with Grignard reagent, HCN and H2S, reduction with Zn + CH3COOH, dimerization to dioxane (mechanism). Styrene oxide - Synthesis from styrene, ring opening reactions with acid and alkali, reduction with *LiAlH4*.		

	C) Thiols and thioethers: Ethanethiol - Synthesis from ethyl iodide, oxidations with I2 and H2O2. Diethyl sulphide - Synthesis from ethyl bromide, Williamson's synthesis, desulphurization with Raney Ni, decomposition with alkali		

Teaching Plan for Practical (Second Semester)

Class: BSc Part-1

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	Complete analysis of simple organic compounds (like urea, thiourea, benzoic acid, Salicylic acid, oxalic acid, glucose, naphthalene, para-toluidine, benzamide, etc.) containing one or two functional groups involving following steps. i) Preliminary examination ii) Detection of elements iii) Detection of functional groups iv) Determination of melting point v) Preparation of derivative and determination of its melting point vi) Performance of spot test, if any 1. Qualitative analysis of compound-1 2. Qualitative analysis of compound-2 3. Qualitative analysis of compound-3 4. Qualitative analysis of compound-4 5. Qualitative analysis of compound-5 6. To determine the strength of oxalic acid by titration with KMnO4. To determine strength of FAS by titration with KMnO4 using internal indicator. 8 Determination of temporary hardness of water sample. 9 To determine the strength of oxalic acid by titration with KMnO4. 10 To determine strength of FAS by titration with KMnO4 using internal indicator. 11 Determination of order of reaction of hydrolysis of methyl acetate by an acid. 12 To study kinetics of saponification of ethyl acetate by NaOH.	174	

Teaching Plan for Theory (Fourth Semester)

Class: BSc Part-2

Sr. No.	*Topic to be covered*	Lectures Available	Lectures Utilized

Unit 2			
	A] Inner transition elements: Definition, Lanthanides and Actinides. Comparative study of Lanthanides with respect to following properties:(i) Electronic configuration (ii) Atomic and ionic radii lanthanide contraction definition, cause and effect of lanthanide contraction (iii) Oxidation states (iv) Magnetic properties (v) Color of salts (vi) Complex formation behavior. Occurrence of lanthanides. Isolation of lanthanides by ion exchange method. Actinides-Electronic configuration and oxidation states. Comparison of lanthanides and actinides	16	

Teaching Plan for Practical (Fourth Semester)

Class: BSc Part-2

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	Exercise I: Inorganic estimations 14 Laboratory sessions 1) Chromatographic separation of binary mixture containing Cu (II), Co (II) and Ni (II) ions by paper chromatography and determination of R f values. 2) Estimation of Zn (II) by complexometric titration. 3) To determine the strength of unknown calcium salt solution by complexometric titration. 4) Estimation of hardness of water by complexometric titration. 5) Colorimetric or spectrophotometric estimation of Cu (II) in commercial copper sulphate sample as ammonia complex. 6) To determination of concentration of unknown KMnO4 solution from standard solutions of KMnO4 by colorimetrically or spectrophotometrically. Exercise II: Organic Chemistry Practicals 12 Laboratory Sessions 1. Isolation of casein from milk. 2. Isolation of nicotine from tobacco leaves. 3. Isolation of caffine from tea leaves. 4. Isolation of lycopene from tomato juice. 5. Estimation of glucose. 6. Estimation of acetamide. 7. Determination of equivalent weight of an organic acid.	58	

Teaching Plan for Theory (Sixth Semester)

Class: BSc Part-3

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
Unit 4 NMR and Mass spectroscopy			
	A] NMR spectroscopy: Introduction, spin quantum number, instrumentation, Aspects of NMR- number of signals (equivalent and non-equivalent protons), positions of signals (chemical shift), intensities of signals, splitting of signals (spin-spin coupling), coupling constant, applications. B] Mass spectroscopy: Introduction, theory, instrumentation-(ion sources), Mass spectra of neopentane and methanol, molecular ion peak, base peak, metastable peak, Rules of fragmentation, applications.	16	

Teaching Plan for Practical (Sixth Semester)

Class: BSc Part-3

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	Exercise I: Organic Chemistry Experiments: 16 Laboratory sessions 1. Estimation of formaldehyde. 2. Estimation of glycine. 3. Estimation of ascorbic acid (vitamin C). 4. Estimation of phenol by bromination method. 5. Estimation of aniline by bromination method. 6. Estimation of urea by hypobromite method. 7. Estimation of unsaturation by bromination method. 8. Determination of iodine value of oil. 9. Determination of equivalent weight of an ester by saponification. 10. Separation of a mixture of methyl orange and methylene blue by thin layer chromatography (using benzene). 11. Separation of a mixture of 2,4-dinitro phenyls of acetaldehyde and benzaldehyde by thin layer chromatography (using benzene: petroleum ether = 3:1). 12. Separation of a mixture of dyes by thin layer chromatography (using cyclohexane: ethyl acetate = 8.5:1.5). 13. Separation of a mixture of 2,4-dinitro phenyls of	192	

	acetaldehyde and benzaldehyde by thin layer chromatography (using toluene: petroleum ether). Exercise II: Physical Chemistry experiments 10 Laboratory sessions 1. To determine dissociation constant of weak acid by conductometry. 2. To determine dissociation constant of weak acid by potentiometry. 3. To study potentiometric titration of KCl and AgNO3. 4. To determine dissociation constant of dibasic acid by pH-metry. 5. To verify Beer's Lambart's law using KMnO4/K2Cr2O7. 6. To determine pH of a soil sample by pH-meter. 7. To determine solubility and solubility product of sparingly soluble salts conductometrically. 8. To study strong acid and strong base titration by pH-metry.		

Teaching Plan for Theory (First Semester)

Class: MSc Part-1

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
Unit 2 Stereochemistry			
	Conformational analysis of cycloalkanes (5-8 membered rings), substituted cyclohexanes, mono substituted, disubstituted and trisubstituted cyclohexanes, decalin system, effect of conformation on reactivity, Conformational analysis of n-butane and its derivatives, ethylene glycol, 1,2-dihaloethane and related compounds elements of symmetry, Concept of chirality and molecular dissymmetry, molecules with more than one chiral center, meso compounds, threo and erythro isomers, method of resolution, optical purity, topicity of ligands, enantiotropic and distereotopic atoms, groups and faces, prochirality, Cahn-Ingold-Prelog System to describe configuration at chiral centers. Inter conversion of Newman, Sawhorse and Fischer projection. Asymmetrical synthesis, optical activity in absence of chiral carbon (biphenyl, spiranes and allenes), Chirality due to helical shape. Chirality of heteroatoms, stereospecific and stereoselective synthesis.	16	

Teaching Plan for Theory (Second Semester)			
Class: MSc Part-1			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
Unit 4 Molecular Rearrangement and Green Chemistry			
	A) Molecular rearrangements and fragmentation reactions: Molecular rearrangements: Definition and classification of molecular rearrangements involving: 1. electron deficient carbon: Pinacol-Pinacolone, Semi-Pinacol Wagner- Meerwein, Tiffenev –Demjnov ring expansion, and Arndt-Eistert synthesis, Dienone-phenol rearrangement 2. electron deficient nitrogen: Hofmann, Lossen, Curtius, Schmidt Neber, Stieglitz and Beckmann rearrangements 3. electron deficient oxygen: Baeyer-Villiger oxidation, Dakin reaction 4. Base catalysed rearrangements: Benzil-Benzilic acid, Favorskii, Sommlett-Hauser and Smiles rearrangement Fragmentation reactions: Electron push and pull requirement, Beckmann, Eschenmoser, Alicyclic-Grobb fragmentation. B) Green Chemistry: Designing a green synthesis: Choice of starting material, choice of solvents. Basic principle of green chemistry, Concept of atom economy with suitable examples, Green Synthesis of styrene, urethane, caprolactum, paracetamol, Synthesis of Ibuprofen. Microwave induced green synthesis, Ionic liquids as Green Solvents, Chemical reactions involved in Bhopal gas tragedy, Minamata disease, Seveso (Italy) disaster	16	

2) Dr. V.D. Inagale

Time Table

Faculty: SCIENCE

Subject: CHEMISTRY

Period	1	2	3	4	5	6	
Day / Time	08:00 to 10:24	11:00 to 11:48	11:48 to 12:36	12:36 to 01:24	01:24 to 2:22	2:30 to 4:54	
MON	II (P) B_1		III (T)			II (P) B_2	
TUE	II (P) B_1	III (T)				II (P) B_2	
WED	III (P)C_1			II (T)			
THUS	III (P)C_1			I (T)			
FRI	I (P) A_1			II (T)		I (P) A_2	
		7:30 to 8:18	8:18 to 9:06	9:16 to 10:04		10.04to 12.28	12.28 to 2.52
SAT						I(P) A_1	I(P) A_2

Allotted Workload

Subject : CHEMISTRY

Year : 2022-2023

Sr. No.	Class	No. of periods per week			Unit Allotted
		Lectures	Tutorials	Practical	
1	B.Sc I	01	---	4×3=12	01
2	B.Sc II	02	---	4×3=12	02
3	B.Sc III	02	---	2×3=06	02
4	**Total**	**05**	**---**	**30**	**05**

Total Workload per week (L+T+P) : 05 (L) + 30 (P) = 35 (28 Hrs.)

Teaching Periods Available per month during the session 2022-23

Subject :

Faculty : SCIENCE
CHEMISTRY

	ODD SEMESTER							EVEN SEMESTER				
Class	Periods	JUL-22	AUG-22	SEP-22	OCT-22	NOV-22	Total	FEB-23	MAR-23	APR-23	MAY-23	Total
B.Sc I	Theory	01	03	05	03	03	**15**	04	05	04	04	17
	Practical	12	48	48	36	36	**180**	42	54	42	42	180
B.Sc II	Theory	02	08	08	05	07	**30**	07	08	06	07	28
	Practical	12	42	48	42	33	**177**	48	42	48	42	180
B.Sc III	Theory	02	07	08	06	06	**29**	08	07	08	07	30
	Practical	12	42	54	30	42	**180**	42	48	48	48	186

Syllabus:

Teaching Plan for Theory (First Semester)		**Class : B.Sc Part I**	
Sr. No.	Topic to be covered	Lectures Available **15L**	Lectures Utilized
01	**Unit-VI**	**14**	
	A) Liquid State: Definition of surface tension, Its SI unit and effect of temperature on surface tension, Derivation of expression for relative surface tension by stalagmometer method.Applications of surface tension. Viscosity, definition of coefficient of viscosity, Its SI unit and effect of temperature on viscosity, Derivation of expression for relative viscosity by Ostwald's	14	

	viscometer method, Applications of viscosity. B) Physical Properties and Molecular Structure: I. Electrical Properties: (i) Polar and non-polar molecules. Dipole moment. (ii) Induced polarization and orientation polarization. Clausius Mossotti equation (only qualitative treatment). (iii) Measurement of dipole moment by temperature and refractitivity methods. (iv) Applications of dipole moment for the determination of molecular structure. i.e. percentage ionic character of covalent bonding, molecular geometry, cis-trans isomers, ortho, meta and para isomers of a disubstituted benzene. II. Magnetic Properties: (i) Paramagnetic and diamagnetic substances, origin of paramagnetism, diamagnetism, ferromagnetism and antiferromagnetism. (ii) Volume, specific, mass and molar susceptibility. Relationship between molar magnetic susceptibility and magnetic moment. (iii) Relationship between magnetic moment and number of unpaired electrons. (iv) Gouy's balance method for determination of magnetic susceptibility. (v) Application of magnetic moment in the determination of molecular structure. (vi) Numerical		
	Unit Test	01	

Teaching Plan for Practical (First Semester) **Class : B.Sc Part I**

Sr. No.	List of Practical/Laboratory Experiments/Activities etc	Lectures Available	Lectures Utilized
		180L	
01	Preparation of Acetyl derivative of aromatic primary amine (aniline or toluidine).	15	

02	Preparation of Benzanilide (Benzoylation).	15	
03	Preparation of Benzoic acid from Benzamide (Hydrolysis).	15	
04	Preparation of Benzoic acid from benzaldehyde (Oxidation).	15	
05	Preparation of phenyl–azo–β–naphthol dye (Diazotisation)	15	
06	Base catalysed Aldol Condensation (Synthesis of dibanzal propanone).	15	
07	Preparation of p-nitroacetanilide from acetanilide.	15	
08	Determination of surface tension of a given liquid using Stalagmometer	15	
09	Determination of the parachor value of -CH2- group (methylene) using Stalagmometer	15	
10	Determination of coefficient of viscosity of aqueous solution of ethanol or polymer at room temperature.	15	
11	Determination of unknown percentage composition of given glycerol solution from standard 2%, 4%,6%,8% and 10% solutions of glycerol	15	
12	Determination of the heat of solution of KNO3 (5% solution)	15	

Teaching Plan for Theory (Second Semester) **Class : B.Sc Part I**

Sr. No.	Topic to be covered	Lectures Available **14L**	Lectures Utilized
01	**UNIT-II**		
	A) VSEPR Theory: Various rules under VSEPR theory to explain molecular geometry (following examples may be taken to explain various rules- SnCl2, CH4, NH3, H2O, SF4, ClF3, XeF4, XeO3, PCl3. Limitations of VSEPR theory	04	

	B) Molecular Orbital Theory: Postulates of MO theory. LCAO approximation. Formation of bonding and antibonding MOs. Rules for LCAO. MO energy level diagram. Concept of bond order. MO structure of homonuclear diatomic molecules of namely He2, H2, N2 and O2. Stability sequence of species of O2 i.e. O2, O2+, O22+, O2- and O22-. Paramagnetic nature of O2. MO structure of heteronuclear diatomic molecules viz. NO, HF and CO (Coulson's structure). Explanation of important properties of CO viz. – triple bond, almost nonpolar nature, electron donor and acceptor behavior. Comparison of VB and MO theories	10	

Teaching Plan for Practical (Second Semester)		**Class : B.Sc Part I**	
Sr. No.	Topic to be covered	Lectures Available **180L**	Lectures Utilized
01	Exercise I: Organic Qualitative Analysis **(05)** Complete analysis of simple organic compounds (like urea, thiourea, benzoic acid, Salicylic acid, oxalic acid, glucose, naphthalene, para-toluidine, benzamide, etc.) containing one or two functional groups involving following steps. i) Preliminary examination ii) Detection of elements iii) Detection of functional groups iv) Determination of melting point v) Preparation of derivative and determination of its melting point vi) Performance of spot test, if any .	**138**	
	1) Qualitative analysis of compound-1	27	
	2) Qualitative analysis of compound-2	27	
	3) Qualitative analysis of compound-3	28	
	4) Qualitative analysis of compound-4	28	

	5) Qualitative analysis of compound-5	28	
02	Exercise II: Volumetric Analysis	**42**	
	6) To determine the strength of oxalic acid by titration with KMnO4.	6	
	7) To determine strength of FAS by titration with KMnO4 using internal indicator.	6	
	8) Determination of temporary hardness of water sample.	6	
	9) Estimation of Zn++ ions by complexometric titration.	6	
	10) Prepare 0.1NH2SO4 solution and find out its exact normality using NaOH as anintermediate solution and 0.1N oxalic acid as a standard solution.	6	
	11) Determination of order of reaction of hydrolysis of methyl acetate by an acid.	6	
	12) To study kinetics of saponification of ethyl acetate byNaOH	6	

Teaching Plan for Theory (Third Semester) **Class : B.Sc Part II**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	**UNIT-I & III**	**30L**	
02	**UNIT-I**	**14**	
	a) Covalent Bonding: Molecular Orbital Theory. Postulates of MO theory. LCAO approximation. Formation of bonding and antibonding MOs. Rules for LCAO. MO energy level diagram. Concept of bond order. MO structure of homonuclear diatomic molecules of namely He_2, H_2, N_2 and O_2 . Stability	06	

	sequence of species of O_2 i.e. O_2, O_2^+, O_2^{2+}, $O_2^-$and O_2^{2-}. Paramagnetic nature of O_2. MO structure of heteronuclear diatomic molecules viz. NO, HF and CO (Coulson's structure). Explanation of important properties of CO viz. – triple 15 16 bond, almost nonpolar nature, electron donor and acceptor behaviour. Comparison of VB and MO theories		
	b) Metallic Bonding: Free electron theory and properties of metals such as electrical and thermal conduction, malleability, ductility and metallic lusture. VB theory or Resonance theory of metals. Band theory to explain nature of conductors, insulators and semiconductors (both intrinsic and extrinsic).	03	
	c)VSEPR Theory: Various rules under VSEPR theory to explain molecular geometry (following examples may be taken to explain various rules- $BeCl_2$, BF_3, CH_4, NH_4^+, PCl_5, SF_6, IF_7, $SnCl_2$, NH_3, H_2O, SF_4, ClF_3, BrF_5, XeF_6, SOF_4, COF_2, PCl_3,). Limitations of VSEPR theory.	05	
	Unit Test	01	
03	**UNIT-III**	**14**	
	A] Aldehydes and Ketones: Preparation of acetaldehyde from ethanol, ethylidene chloride and acetylene. Preparation of benzaldehyde from benzene (Gattermann-Koch reaction) and toluene. Preparation of acetone from isopropyl alcohol, isopropylidene chloride and propyne. Preparation of acetophenone from benzene and ethyl benzene. Structure of carbonyl group, acidity of á-hydrogen in carbonyl compounds. Reactions of aldehydes & ketones: Cannizaro's, Reformatsky, Perkin with mechanism, Mannich reaction, Benzoin and Aldol condensations. Clemmensen, Wolf-Kishner, MPV and $LiAlH_4$ reductions.	08	
	B] Carboxylic acids: Structure and reactivity of carboxylic groups. Acidity	06	

	of carboxylic acids, effects of substituents on acids strength. Oxalic acid: Preparation from ethylene glycol and cyanogen. Reactions: Reaction with ethyl alcohol, ammonia, glycerol and action of heat. Lactic acid: Preparation from acetaldehyde and pyruvic acid. Reactions: Reaction with ethanol, PCl_5, action of heat, oxidation and reduction. Benzoic acid: Preparation from toluene, benzyl alcohol, phenyl cyanide and benzamide. Reactions : Reactionwith ethanol, PCl_5 and ammonia. Salicylic acid: Preparation by Reimer-Tiemann reaction. Reactions: Reaction with CH_3COCl,CH_3OH and C_6H_5OH		
	Unit Test	01	

Teaching Plan for Practical (Third Semester)		**Class : B.Sc Part II**	
Sr. No.	Topic to be covered	Lectures Available **177L**	Lectures Utilized
01	**EXERCISE I: a) Volumetric Analysis (07)**	**100**	
	1) Prepare 0.1N oxalic acid standard solution and find out the acid neutralizing capacity of an antacid using NaOH as an intermediate solution.	15	
	2) Prepare 0.1N H_2SO_4 solution and find out its exact normality using NaOH as an intermediate solution and 0.1N oxalic acid as standard solution.	15	
	3) To determine the strength of oxalic acid by titration with KMnO4.	14	
	4) To determine percentage purity of Ferrous Ammonium Sulphate (FAS) by titration with $KMnO_4$.	14	
	5) To determine strength of FAS by titration with $K_2Cr_2O_7$using internal indicator.	14	
	6) To determine strength of $K_2Cr_2O_7$by titration with FAS using internal indicator.	14	
	7) Estimation of copper (II) in commercial copper sulphate sample by iodometric titration	14	

02	**b) Gravimetric Analysis (03):**	**20**	
	Estimation of Ba^{2+} as $BaSO_4$	6	
	Estimation of Fe^{3+} as Fe_2O_3 using china and silica crucible	7	
	Estimation of Ni^{2+} as Ni-DMG using sintered glass crucible	7	
03	**EXERCISE II: Physical Chemistry Experiment (08)**	**60**	
	1) To determine refractive index by Abbe's refractometer.	8	
	2) To construct phase diagram of phenol-water system and to determine consolute temperature for the system.	8	
	3) To determine transition temperature of $MnCl_2.4H_2O$.	6	
	4) To study kinetics of hydrolysis of methyl acetate catalyzed by acid.	6	
	5) To study kinetics of saponification of ethyl acetate by NaOH. (Equal concentration)	6	
	6) To determine partition coefficient of benzoic acid between benzene and water.	8	
	7) To determine partition coefficient of iodine between CCl_4/Kerosene and water.	8	
	8) To determine solubility of benzoic acid at different temperature and heat of solution.	7	

Teaching Plan for Theory (Fourth Semester) **Class : B.Sc Part II**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	**UNIT-III & UNIT-IV**	**28**	
02	**UNIT-III**	***14***	
	a)Polynuclear Hydrocarbon: Naphthalene - Haworth synthesis, orbital picture, Reactions – electrophilic substitution (orientation) Preparation of naphthols from naphthalene sulphonic acids and naphthylamines from	04	

	naphthols.		
	b)Reactive Methylene Compounds: Malonic Ester: Synthesis from acetic acid, Synthetic applications- Synthesis of acetic acid , succinic acid, glutaric acid, crotonic acid and malonyl urea. Acetoacetic ester: Synthesis from ethyl acetate, Synthetic applications- Synthesis of acetic acid, propionic acid, isobutyric acid, succinic acid, glutaric acid, crotonic acid, acetyl acetone and 4-methyl uracil	06	
	c)Carbohydrates: Constitution of glucose, cyclic structure, Pyranose and Furanose structure, Epimerization, conversion of glucose to fructose and vice-versa, Introduction to fructose, ribose, 2-deoxyribose, maltose, sucrose. (their structures onlydetermination not needed).	04	
03	**UNIT-IV**	**15**	
	a)Aromatic Nitro Compounds: Nitrobenzene: Synthesis from benzene, Reduction of nitrobenzene in acidic, neutral and alkaline medium	03	
	b)Amino Compounds: Basicity and effect of substituents. Methods of preparation of aniline from nitrobenzene, Reactions: with acetyl and benzoyl chlorides,Br_2(aq) and $Br_2(CS_2)$, Carbylamine reaction, alkylation,Hoffmann's exhaustive methylation and its mechanism.	04	
	c)Diazonium Salts: Preparation benzene diazonium chloride, Synthetic applications- Preparation of benzene,phenol, halobenzene,nitrobenzene,benzonitrile, coupling with phenol and aniline	03	
	d)amino Acids and Proteins: Classification, Strecker and Gabrial phthalimide synthesis, Zwitterion structure, Isoelectric point, peptide synthesis, Structure determination of polypeptides by end group analysis	04	
04	**UNIT TEST**	01	
Teaching Plan for Practical I (Fourth Semester)		**Class : B.Sc Part II**	

Sr. No.	Topic to be covered	Lectures Available **180L**	Lectures Utilized
01	**EXERCISE I: Inorganic Estimation (06)**	**120**	
	1) Chromatographic separation of binary mixture containing Cu(II), Co(II) and Ni(II) ions by paper chromatography and determination of Rf values.	20	
	2) Estimation of Zn(II) by complexometric titration.	20	
	3) To determine the strength of unknown calcium salt solution by complexometric titration.	20	
	4) Estimation of hardness of water by complexometric titration.	20	
	5) Colorimetric or spectrophotometric estimation of Cu(II) in commercial copper sulphate sample as ammonia complex.	20	
	6) To determination of concentration of unknown $KMnO_4$ solution from standard solutions of $KMnO_4$ by calorimetrically or spectrophotometrically	20	
02	**EXERCISE II: Organic Practical (07)**	**60**	
	1. Isolation of casein from milk.	8	
	2. Isolation of nicotine from tobacco leaves.	9	
	3. Isolation of caffeine from tea leaves.	9	
	4. Isolation of lycopene from tomato juice.	8	
	5. Estimation of glucose.	9	
	6. Estimation of acetamide.	9	
	7. Determination of equivalent weight of an organic acid	8	

Teaching Plan for Theory (Fifth Semester) **Class : B.Sc Part III**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized

01	**UNIT-III & IV**	29	
	UNIT-III	14	
	A] Heterocyclic compounds: Nomenclature, Pyrrole: Synthesis from acetylene, succinimide and furan, Basicity, Electrophilic substitution reactions (orientation) – nitration, sulphonation, acetylation and halogenation , Molecular orbital structure	04	
	Pyridine: Synthesis from acetylene and pentamethylene diamine hydrochloride, Basicity, Electrophilic substitution reactions (orientation) – nitration, sulphonation, Nucleophilic substitution reactions (orientation)- with $NaNH_2$, C_6H_5Li and KOH	03	
	Organometallic compounds: Grignard reagents: Methyl magnesium bromide- Synthesis from methyl bromide (only reaction) Synthetic applications: Electrophilic substitution reactions-formation of alkanes, alkenes, higher alkynes and other organometallic compounds, Nucleophilic substitution reactions- Reaction with aldehydes and ketones, ethylene oxide, acetyl chloride, methyl cyanide and CO_2.	04	
	Methyl lithium-Synthesis and reaction with water, formaldehyde, acetaldehyde, acetone, ethylene oxide and CO_2.	03	
04	**UNIT-IV**	14	
	a)Dyes: Classification on the basis of structure and mode of application, Preparation and uses of Methyl orange, Crystal violet, Phenolphthalein , Alizarin and Indigo	05	
	b)Drugs: Analgesic and antipyretics: Synthesis and uses of phenylbutazone. Sulpha drugs: Synthesis and uses of sulphanilamide and sulphadiazine. Antimalarials: Synthesis of chloroquine from 4,7 dichloroquinoline and its uses	05	
	c)Pesticides: Insecticides: Synthesis and uses of malathion. Herbicides: Synthesis and uses of 2,4 dichloro phenoxy acetic acid (2,4-D). Fungicides:	05	

	Synthesis and uses of thiram (tetramethyl thiuram disulphide.		
05	**UNIT TEST**	01	

Teaching Plan for Practical (Fifth Semester) **Class : B.Sc Part III**

Sr. No.	Topic to be covered	Lectures Available **180 L**	Lectures Utilized
01	**EXERCISE I: Inorganic Preparation (06)**	**60**	
	1. Preparation of tetraamminecopper (II)sulphate.	6	
	2. Preparation of hexaamminenickel (II)chloride.	6	
	3. Preparation of potassiumtrioxalate aluminate (III).	6	
	4. Preparation of Prussian blue.	6	
	5. Preparation of chrome alum.	6	
	6. Preparation of sodium thiosulphate and dithionite. (Comment on VB structure, magnetic properties and color of 1, 2 and 3 complexes)	6	
02	**EXERCISE II: Physical Chemistry Experiments (06)**	**120**	
	1. To determine strength of given HCl solution conductometrically.	18	
	2. To determine strength of given CH_3COOH solution conductometrically.	18	
	3. To determine strength of given HCl solution potentiometrically.	18	
	4. To determine strength of HCl and CH_3COOH in a given mixture conductometrically.	18	
	5. To determine redox potential of Fe^{+2}/Fe^{+3} system potentiometrically.	16	
	6. To determine molecular weight by Rast's method.	16	
	7. To determine specific rotation of optically active	16	

	compound by Polarimeter.		
Teaching Plan for Theory (Sixth Semester)		**Class : B.Sc Part III**	
Sr. No.	Topic to be covered	Lectures Available **30L**	Lectures Utilized
01	**UNIT-I**	**14**	
	A] Kinetic Aspects of Metal Complexes : Thermodynamic and kinetic stability of the complexes, factors affecting stability of complexes. Brief idea about substitution reactions,SN^1 -dissociative and SN^2 - associative mechanism. Labile and inert complexes. Factors affecting lability of complexes namely arrangement of d-electrons (on the basis of VB theory), size of central metal ion, charge of central metal ion, geometry of complexes. Substitution reactions in square planar complexes mechanism.	**06**	
	B] Analytical Chemistry : **1) Spectrophotometry and Colorimetry :-** Concept of ëmax, Beer-Lambert's law (Only statement and final equation, no derivation). Calibration curve and its importance. Validity and limitations of Beer-Lambert's law. Verification of Beer's law. Block diagram of colorimeter and spectrophotometer with brief description of each component and its function. Difference between colorimetric and spectrophotometric technique for determination of concentration of metal ion (Example of determination of Cu(II).	**04**	
	2) Paper Chromatography :- Definition and classification of chromatographic techniques. Principle of differential migration. Principle and technique of paper chromatography -ascending, descending and circular , Rf value and factors affecting	**04**	

	Rf value.		
	Unit Test	**01**	
02	**UNIT-II**		
	a) **Organometallic Chemistry**: Definition, nomenclature and classification of organometallic compounds. Metal carbonyls- definition and classification. Preparation, properties, structure and bonding in $Ni(CO)_4$, $Fe(CO)_5$, $Cr(CO)_6$. Nature of M-C bond in metal carbonyls.	05	
	b)Inorganic Polymer: Definition and classification. Silicones: preparation, properties structure and bonding and applications. Phosphonitrile halides polymers- preparation, properties, structure and bonding in cyclic polymers	05	
	c)Bioinorganic Chemistry: Essential and trace elements in biological processes. Biological role of Na^+, K^+, Ca^{2+} and Mg^{2+} ions. Metalloporphyrins- Haemoglobin and Myoglobin and their role in oxygen transport	04	
03	**UNIT TEST**	01	

Teaching Plan for Practical (Sixth Semester) **Class : B.Sc Part III**

Sr. No.	Topic to be covered	Lectures Available **186L**	Lectures Utilized
01	**EXERCISE I: Organic Chemistry Preparation (13)**	**100**	
	1. Estimation of formaldehyde.	8	
	2. Estimation of glycine.	8	
	3. Estimation of ascorbic acid (vitamine C).	8	
	4. Estimation of phenol by bromination method.	8	
	5. Estimation of aniline by bromination method.	8	

	6. Estimation of urea by hypobromite method.	8	
	7. Estimation of unsaturation by bromination method.	8	
	8. Determination of iodine value of oil.	8	
	9. Determination of equivalent weight of an ester by saponification.	8	
	10. Separation of a mixture of methyl orange and methylene blue by thin layer chromatography (using benzene).	7	
	11. Separation of a mixture of 2,4-dinitro phenyls of acetaldehyde and benzaldehyde by thin layer chromatography (using benzene : petroleum ether = 3:1).	7	
	12. Separation of a mixture of dyes by thin layer chromatography (using cyclohexane: ethyl acetate = 8.5:1.5).	7	
	13. Separation of a mixture of 2,4-dinitro phenyls of acetaldehyde and benzaldehyde by thin layer chromatography (using toluene: petroleum ether).	7	
02	**EXERCISE II: Physical Chemistry Experiments (08)**	**86**	
	1. To determine dissociation constant of weak acid by conductometry.	10	
	2. To determine dissociation constant of weak acid by potentiometry.	10	
	3. To study potentiometric titration of KCl and $AgNO_3$.	11	
	4. To determine dissociation constant of dibasic acid by pH-metry.	11	
	5. To verify Beer's Lambart's law using $KMnO_4$ /$K_2Cr_2O_7$.	11	
	6. To determine pH of a soil sample by pH-meter.	11	
	7. To determine solubility and solubility product of sparingly soluble salts conductometrically.	11	

	8. To study strong acid and strong base titration by pH-metry. Distribution of Marks for Practical Examination	11	

3) **Name: Mr. K P Sabale**

Time Table: Odd Semester

Faculty: SCIENCE

Subject: CHEMISTRY

	Period	1	2	3	4	5	6
		Practical	**Theory**				**Practical**
	Day / Time	8 to 10:24(Pr)	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	1:34 to 2:22	2:22 to 4:46(Pr)
UG	MON	II(B_1)					II(B_2)
UG	TUE	II(B_1)					II(B_2)
UG	WED	III(C_1)		III(T)			III(C_2)
PG	WED					MSC-I	
UG	THUS	III(C_1)		III(T)			III(C_2)
UG	FRI	I(A_1)		I(T)			--
			7:30 to 8:18	8:18 to 9:06	9:06 to 9:54	10:04 to 12:28	12:28 to 2:52
UG	SAT				II(T)	BSc-I(P)(A_1)	--

Allotted Workload

Subject: CHEMISTRY

Year: 2022-23

Sr. No.	Class	Allotted workload per week		
		Lectures	Practical	Paper Allotted
1	BSc-I	01	2 x 3 = 6	1
2	BSc-II	01	4 x 3 = 12	1
3	BSc-III	02	4 x 3 = 12	2
4	MSc-I	01	-	1
4	Total	05(Th)	30(Pr)	05

Total Workload per week (T+P): 04 (L) + 30 (Pr) = 34 (27.12 Hrs.)

Time Table: Even Semester

Name: Mr. K P Sabale

Faculty: SCIENCE Subject: CHEMISTRY

Period	1	2	3	4	5	6
	Practical	**Theory**				**Practical**
Day / Time	8 to 10:24(Pr)	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	1:34 to 2:22	2:22 to 4:46(Pr)
MON	II(B_1)					II(B_2)
TUE	II(B_1)					II(B_2)
WED	III(C_1)			II(T)		III(C_2)
THUS	III(C_1)		III(T)			III(C_2)
FRI	I(A_1)		I(T)			--
		7:30 to 8:18	8:18 to 9:06	9:06 to 9:54	10:04 to 12:28	12:28 to 2:52
SAT		I(T)			BSc-I(P)(A_1)	--
SUN		I(T)				

Allotted Workload

Subject: CHEMISTRY Year: 2022-23

Sr. No.	Class	Allotted workload per week		
		Lectures	Practical	Paper Allotted
1	BSc-I	02	2 x 3 = 6	2
2	BSc-II	01	4 x 3 = 12	1
3	BSc-III	01	4 x 3 = 12	1
5	MSc-I	01	-	1
4	Total	05(Th)	30(Pr)	05

Total Workload per week (T+P): 05 (L) + 30 (Pr) = 35 (28 Hrs.)

Teaching Periods Available per month during the session 2022-23 (Odd/Even Sem)

Faculty: SCIENCE **Subject**: CHEMISTRY

		ODD SEMESTER						EVEN SEMESTER				
Class ↓	Periods →	JUL - 2022	AUG-2022	SEP - 2022	OCT - 2022	NOV-2022	**Total**	FEB - 2023	MAR-2023	APR -2023	MAY -2023	Total
BSc-I	Theory	01	04	05	03	03	**16**	12	13	14	-	**39**
	Practical	02	08	08	07	06	**31**	08	09	09	-	**26**
BSc – II	Theory	01	04	04	04	03	**16**	04	05	04	01	**14**
	Practical	04	14	16	12	12	**58**	16	16	16	-	**48**
BSc-III	Theory	02	07	09	05	07	**30**	04	05	04	01	**14**
	Practical	04	14	18	10	14	**60**	16	20	16	-	**52**

Allotted Units 2022-23

Sr No	Unit Name					
	Unit No	Odd Semester	Class	Unit No	Even Semester	Class
1	II	Acids & Bases	BSc-1	III	Haloalkanes, Haloarenes, Polyhydric alcohols	BSc-1
2	V	Thermodynamics and Equilibrium	BSc-2	VI	Chemical Kinetics	BSc-1

3	I	Co-Ordination Compounds-I	BSc-3	I	Chemistry of elements of transition series & Extraction of Elements	BSc-2
4	II	Crystal Field theory & Electronic Spectra of transition Metal Complexes	BSc-3	III	Electronic Spectroscopy & IR Spectroscopy	BSc-3
5	III	Symmetry of Molecules	MSc-I			

Teaching Plan for Theory (First Semester)		**Class : BSc Part I**	
Sr. No.	**Topic to be covered**	**Lectures Available**	**Lectures Utilized**
	Unit- II		
Unit II	**A) Acids and Bases-** Arrhenius, Bronsted-Lowry, and Lewis's theory of acids and bases, Theory of solvent systems and Lux-Flood concept of acids and bases. Hard and soft acids and bases. Pearson's HSAB or SHAB principle with important applications. **B) Nonaqueous Solvents-**Requirements of a good solvent. Water as a universal solvent. Physical properties of solvents namely liquid range, dielectric constant, dipole moment, heat of vaporization and solubility behavior. Classification of solvents. Acid base, precipitation, redox, solvolysis and complexation reactions in liquid ammonia. Merits and demerits of liquid ammonia as a solvent.	16	
	Unit Test		

Teaching Plan for Practical (First Semester)		**Class : BSc Part I**	
Sr. No.	**Topic to be covered**	**Lectures Available**	**Lectures Utilized**
	Exercise-1 Organic Preparations	**31**	
1	Preparation of Acetyl derivative of aromatic primary amine (aniline or toluidine).		
2	Preparation of Benzanilide (Benzoylation).		
3	Preparation of Benzoic acid from Benzamide (Hydrolysis).		
4	Preparation of Benzoic acid from benzaldehyde (Oxidation).		
5	Preparation of phenyl–azo–β–naphthol dye (Diazotisation)		
6	Base catalysed Aldol Condensation (Synthesis of dibanzal propanone).		

7	Preparation of p-nitroacetanilide from acetanilide.		
	Exercise II: Physical Chemistry Experiments		
8	Determination of surface tension of a given liquid using Stalagmometer		
9	Determination of the parachor value of -CH_2- group (methylene) using Stalagmometer		
10	Determination of coefficient of viscosity of aqueous solution of ethanol or polymer atroom temperature		
11	Determination of unknown percentage composition of given glycerol solution fromstandard 2%, 4%,6%,8% and 10% solutions of glycerol		
12	Determination of the heat of solution of KNO_3 (5% solution)		

Teaching Plan for Theory (Second Semester) **Class : BSc Part I**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	Unit III & Unit VI	**39**	
01	**Unit- III**		
A]	**Haloalkanes:** Vinyl chloride - Synthesis from acetylene and ethylene dichloride, reactions with aqueous and alcoholic KOH, polymerization. Allyl chloride - Synthesis from propylene, reactions with aqueous and alcoholic KOH. Allyl bromide - Synthesis from propylene using NBS, reaction with HBr. Comparison of reactivity of vinyl and allyl chloride.		
B]	**Haloarenes:** Chlorobenzene - Synthesis from phenol, reaction with acetonitrile. Bromobenzene - Synthesis from silver salt of benzoic acid (Hunsdiecker reaction), Wurtz-Fittig reaction. Iodobenzene - Synthesis frombenzene diazonium chloride, Ullmann reaction. Benzyl chloride - Synthesis fromtoluene and benzene, reactions with Mg and NaCN. Comparison of reactivity of chlorobenzene and benzyl chloride, benzyne intermediate mechanism.		
C]	**Polyhydric alcohols:** Ethylene glycol - Synthesis from ethylene and ethylene dibromide, reactions with PCl_5, CH_3COOH and acetone, dehydrations using conc.H_2SO_4, $ZnCl_2$ and phosphoric acid. Pinacol - Synthesis from acetone and α- diketone, Pinacol-Pinacolone rearrangement (mechanism). Glycerol - Synthesis from propylene and 3-chloropropylene, reactions with HNO_3, HCl and Na, dehydration using $KHSO_4$		
D]	**Unit Test**		
02	**Unit-VI- Chemical Kinetics**		
A]	Explanation of terms like rate of reaction, order of a reaction and molecularity. Definition with one example of zero, first and second order reaction. Half-life period of a reaction. Derivation of rate equation for first and second order reaction with equal initial concentration and different initial concentration of a reactant.		

	Characteristics of first and second order reaction. Examples of first and second order reaction and their kinetics study with modified rate equation viz. the reactions (i) decomposition of H_2O_2, (ii) reaction between $K_2S_2O_8$ and KI, (iii) hydrolysis of methyl acetate catalyzed by acid, (iv) saponification of ethyl acetate by NaOH and (v) inversion of cane sugar. Determination of order of a reaction by integration, graphical, equifractional change, vant Hoff's differential method and Ostwald's isolation method. Effect of temperature on reaction rates. Arrhenius equation, activation energy and its determination using Arrhenius equation. Numerical.		
B]	**Unit Test**		

Teaching Plan for Practical (Second Semester)	**Class : BSc Part I**		
Sr. No.	**Topic to be covered**	**Lectures Available**	**Lectures Utilized**
	Exercise-1 Organic Qualitative Analysis	**26**	
	Complete analysis of simple organic compounds (like urea, thiourea, benzoic acid, Salicylic acid, oxalic acid, glucose, naphthalene, para-toluidine, benzamide, etc.) containing one or two functional groups involving following steps. i) Preliminary examination ii) Detection of elements iii) Detection of functional groups iv) Determination of melting point v) Preparation of derivative and determination of its melting point Performance of spot test, if any		
1	Qualitative analysis of compound-1		
2	Qualitative analysis of compound-2		
3	Qualitative analysis of compound-3		
4	Qualitative analysis of compound-4		
5	Qualitative analysis of compound-5		
	Exercise II: Volumetric Analysis		
6	To determine the strength of oxalic acid by titration with $KMnO_4$.		
7	To determine strength of FAS by titration with $KMnO_4$ using internal indicator.		
8	Determination of temporary hardness of water sample.		
9	Estimation of Zn^{++} ions by complexometric titration.		
10	Prepare 0.1NH2SO4 solution and find out its exact normality using NaOH as an intermediate solution and 0.1N oxalic acid as a standard solution.		
11	Determination of order of reaction of hydrolysis of methyl acetate by an acid.		
12	To study kinetics of saponification of ethyl acetate by NaOH.		

Teaching Plan for Theory (Third Semester)	**Class : BSc Part II**		
Sr.	**Topic to be covered**	**Lectures**	**Lectur**

No.		Available	es Utilized
01	**Unit V - Thermodynamics and Equillibrium**	**16**	
A]	**(i)** Gibb's and Helmholtz's free energy function. Physical significance of Gibb's free energy, Change in free energy as a criterion of spontaneity and equilibrium. Variation of free energy G with P & T. Gibb's-Helmholtz's equation in terms of G and its application. **(ii)** Partial molal function, chemical potential, derivations of Gibb's-Duhem equation. Chemical potential of an ideal gas in gaseous mixture. Derivation of vant Hoff's isotherm and its application to equilibrium state. Derivation of vant Hoff's equation and its applications. **(iii)** Numericals		
B]	**Phase Equilibrium:** **(i)** Immiscible liquids, Nerst distribution law and its application to association and dissociation of solute in one of the solvents. Process of extraction, derivation of formula for the amount of solute left unextracted after n^{th} extraction. **(ii)** Phase transition - Clausius-Clyperon equation (only qualitative statement). **(iii)** Partially miscible liquids - Phase diagram of phenol-water, triethyl amine - water and nicotine-water systems. **(iv)** Numericals		
C]	**Unit Test**		

Teaching Plan for Practical (Third Semester) **Class : BSc Part II**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	**Exercise I: Volumetric Analysis**	**58**	
A)	**1)** Prepare 0.1N oxalic acid standard solution and find out the acid neutralizing capacity of an antacid using NaOH as an intermediate solution. **2)** Prepare 0.1N H_2SO_4 solution and find out its exact normality using NaOH as an intermediate solution and 0.1N oxalic acid as standard solution. **3)** To determine the strength of oxalic acid by titration with KMnO4. **4)** To determine percentage purity of Ferrous Ammonium Sulphate (FAS) by titration with $KMnO_4$. **5)** To determine strength of FAS by titration with $K_2Cr_2O_7$using internal indicator. **6)** To determine strength of $K_2Cr_2O_7$by titration with FAS using internal indicator. **7)** Estimation of copper (II) in commercial copper sulphate sample by iodometric titration.		

B)	**Gravimetric Analysis** Estimation of Ba^{2+} as $BaSO_4$, Fe^{3+} as Fe_2O_3 using china and silica crucible and Ni^{2+} as Ni-DMG using sintered glass crucible		
C)	**Exercise-II: Physical Chemistry experiments**		
	1) To determine refractive index by Abbe's refractometer. **2)** To construct phase diagram of phenol-water system and to determine consulate temperature for the system. **3)** To determine transition temperature of $MnCl_2.4H_2O$. **4)** To study kinetics of hydrolysis of methyl acetate catalyzed by acid. **5)** To study kinetics of saponification of ethyl acetate by NaOH. (Equal concentration) **6)** To determine partition coefficient of benzoic acid between benzene and water. **7)** To determine partition coefficient of iodine between CCl_4/Kerosene and water. **8)** To determine solubility of benzoic acid at different temperature and heat of solution.		

Teaching Plan for Theory (Fourth Semester) **Class : BSc Part II**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	**Unit- I**	14	
A]	**Chemistry of elements of transition series:** Definition of transition elements. General characteristics of transition elements. Comparative study of first transition series elements (3d) with reference to following properties: **(i)** Electronic configuration **(ii)** Atomic and ionic size **(iii)** Ionization energy **(iv)** Metallic nature **(v)** Oxidation states **(vi)** Magnetic properties **(vii)** Color of salts **(viii)** Catalytic properties **(ix)** Complex formation behavior. Study of 4d and 5d series elements-Electronic configuration. Comparison of 3d series elements with 4d and 5d series elements with respect to size, oxidation states, magnetic properties and color.		
B]	**Extraction of elements:** Principles involved in extraction of elements. Major methods of extraction of elements. Factors affecting choice of extraction method. Thermodynamics of reduction processes-Ellingham diagrams for oxides and importance of this diagram (only preliminary ideas).		
C]	**Unit Test**		

Teaching Plan for Practical (Fourth Semester) **Class : BSc Part II**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilize

			d
01	**Exercise I: Inorganic estimations**	48	
	1) Chromatographic separation of binary mixture containing Cu(II), Co(II) and Ni(II) ions by paper chromatography and determination of Rf values. **2)** Estimation of Zn(II) by complexometric titration. **3)** To determine the strength of unknown calcium salt solution by complexometric titration. **4)** Estimation of hardness of water by complexometric titration. **5)** Colorimetric or spectrophotometric estimation of Cu(II) in commercial copper sulphate sample as ammonia complex. **6)** To determination of concentration of unknown $KMnO_4$ solution from standard solutions of $KMnO_4$ by colorimetrically or spectrophotometrically.		
02	**Exercise II: Organic Chemistry Practical's**		
	1. Isolation of casein from milk. **2.** Isolation of nicotine from tobacco leaves. **3.** Isolation of caffine from tea leaves. **4.** Isolation of lycopene from tomato juice. **5.** Estimation of glucose. **6.** Estimation of acetamide. **7.** Determination of equivalent weight of an organic acid.		

Teaching Plan for Theory (Fifth Semester) **Class : BSc Part III**

Sr. No.	Topic to be covered	Lectures Availabl e	Lectur es Utilize d
	Unit-I & Unit-II	30	
01	**Unit-I**		
A]	**Coordination Compounds:** Important terms namely molecular or addition compounds, double salts, complex salts, complex ion, ligand, coordination number, central metal ion, etc. Werner's theory of coordination and its experimental verification on the basis of conductance data and formation of AgCl precipitate in case of cobaltammines. Sidgwick's electronic interpretation and its drawbacks, effective atomic number. IUPAC rules for nomenclature of coordination compounds. Structural isomerism-ionization, linkage and coordination in complexes. Geometrical isomerism in octahedral complexes of the type Ma4b2, Ma3b3 , Ma2b2c2, Ma4 bc, M(AA)2b2 . Square planar complexes of the type Ma2b2 and Ma2bc. Optical isomerism in octahedral complexes of type Ma2b2c2, Mabcdef, M(AA)3, M(AA)2b2 and tetrahedral complexes of the type Mabcd and M(AA)2 . Optical isomerism in square planar complexes. Valence		

	bond theory as applied to structure and bonding in complexes of 3d-series elements (Only 4 and 6 coordinates complexes). Inner and outer orbital complexes. Magnetic properties of complexes of 3d series elements. Limitations of VB theory.		
B]	**Chelates:** Definition, classification and applications of chelates in analytical chemistry. Stability of chelate with special reference to chelate effect.		
C]	**Unit Test**		
02	**Unit II**		
A]	**Crystal Field Theory (CFT):** Postulates of CFT, Crystal field splitting in octahedral, distorted octahedral, square planar tetrahedral complexes, concept of CFSE, high spin and low spin complexes on the basis of Ä0 and pairing energy, distribution of electrons in t2g and eg orbitals in high spin and low spin octahedral complexes. Factor affecting magnitude of crystal field splitting in octahedral complexes.		
B]	**Electronic Spectra of Transition Metal Complexes:** Introduction to spectra, selection rules for d-d transitions, spectroscopic terms-determination of ground term symbols for d^1 to d^{10}, spectra of d^1 and d^9 octahedral complexes, Orgel diagram for d^1 and d^9 states, electronic spectrum of $[Ti(H_2O)_6]^{3+}$ complex ion. Spectrochemical series.		
C]	**Unit Test**		

Teaching Plan for Practical (Fifth Semester) **Class : BSc Part III**

Sr. No.	Topic to be covered	Lectures Availabl e	Lectur es Utilize d
01	**Exercise 1: Inorganic Preparations**	60	
	1. Preparation of tetraamminecopper(II)sulphate. 2. Preparation of hexaamminenickel(II)chloride. 3. Preparation of potassiumtrioxalate aluminate (III). 4. Preparation of Prussian blue. 5. Preparation of chrome alum. 6. Preparation of sodium thiosulphate and dithionite. (Comment on VB structure, magnetic properties and color of 1, 2 and 3 complexes)		
02	**Exercise II: Physical Chemistry experiments**		
	1. To determine strength of given HCl solution conductometrically. 2. To determine strength of given CH_3COOH solution conductometrically. 3. To determine strength of given HCl solution potentiometrically. 4. To determine strength of HCl and CH_3COOH in a given mixture conductometrically. 5. To determine redox potential of Fe^{+2}/Fe^{+3} system potentiometrically.		

	6. To determine molecular weight by Rast's method. 7. To determine specific rotation of optically active compound by Polarimeter.		
Teaching Plan for Theory (Sixth Semester)		**Class : BSc Part III**	
Sr. No.	**Topic to be covered**	**Lectures Availabl e**	**Lectur es Utilize d**
	Unit-III	**14**	
01	**Unit-III**		
A]	**Electronic spectroscopy:** Introduction, theory, instrumentation, types of electronic transitions, presentation of electronic spectrum, terms used- chromophore, auxochrome, bathochromic shift, hypsochromic shift, hyperchromic effect and hypochromic effect , Applications in the structure determination of dienes, á,â-unsaturated aldehydes and ketones, aromatic compounds.		
B]	**Infrared spectroscopy:** Introduction, Types of molecular vibrations- stretching and bending, Calculation of vibrational modes, force constant, instrumentation, interpretation of IR, H-stretching, triple bond, double bond and Finger print regions, IR spectra of H_2O, CO_2, C_2H_5OH, CH_3CHO, CH_3COOH and CH_3CONH_2.		
C]	**Unit Test**		
Teaching Plan for Practical (Sixth Semester)		**Class : BSc Part III**	
Sr. No.	**Topic to be covered**	**Lectures Availabl e**	**Lectur es Utilize d**
01	**Exercise I: Organic Chemistry Experiments**	**52**	
	1. Estimation of formaldehyde. **2.** Estimation of glycine. **3.** Estimation of ascorbic acid (vitamine C). **4.** Estimation of phenol by bromination method. **5.** Estimation of aniline by bromination method. **6.** Estimation of urea by hypobromite method. **7.** Estimation of unsaturation by bromination method. **8.** Determination of iodine value of oil. **9.** Determination of equivalent weight of an ester by saponification. **10.** Separation of a mixture of methyl orange and methylene blue by thin layer chromatography (using benzene). **11.** Separation of a mixture of 2,4-dinitro phenyls of acetaldehyde and benzaldehyde by thin layer chromatography(using benzene : petroleum		

	ether = 3:1). **12.** Separation of a mixture of dyes by thin layer chromatography (using cyclohexane:ethyl acetate = 8.5:1.5). **13.** Separation of a mixture of 2,4-dinitro phenyls of acetaldehyde and benzaldehyde by thin layer chromatography (using toluene: petroleum ether).		
02	**Exercise II: Physical Chemistry experiments**		
	1. To determine dissociation constant of weak acid by conductometry. **2.** To determine dissociation constant of weak acid by potentiometry. **3.** To study potentiometric titration of KCl and $AgNO_3$. **4.** To determine dissociation constant of dibasic acid by pH-metry. **5.** To verify Beer's Lambart's law using $KMnO_4$ /$K_2Cr_2O_7$. **6.** To determine pH of a soil sample by pH-meter. **7.** To determine solubility and solubility product of sparingly soluble salts conductometrically. **8.** To study strong acid and strong base titration by pH-metry. Distribution of Marks for Practical Examination		

Teaching Plan for Theory Sem-I Class: MSC-I

Sr. No.	Topic to be covered	Lectures Availabl e	Lectur es Utilize d
1	**Symmetry of Molecules**		
	Symmetry Operations – Symmetry Elements: Rotational Axis of Symmetry and Types of Rotational Axes, Plane of Symmetry and types of Planes, Improper Rotational Axis of Symmetry, Inversion Center and Identity Element –More about Symmetry Elements – Molecular Point Groups: Definition and Notation of Point Groups, Classification Molecules in to C1, Cs, Ci, Cn, Cnv, Cnh, C∞v, Dn, Dnh, Dnd, D∞h, Sn(n=even), Td, Oh, Ih, Kh Groups. Descent in Symmetry with Substitution – Exercises in Molecular Point Groups – Symmetry and Dipole moment – Symmetry criteria for Optical activity. Group multiplication table, matrix representation of symmetry elements. Reducible and irreducible representation, character of representation, character of matrix, Conjugate matrix, Properties of irreducible representations, Great orthogonality theorem (without proof) and its importance, construction of character table of C2v & C3v point group. Mulliken symbolism rules for irreducible representations and its applications with examples.		

4) Mr. N.S. Shelke

Time Table

Faculty: SCIENCE

Subject : CHEMISTRY

Period	1	2	3	4	5	6	
Day / Time	08:00 to 10:24	11:00 to 11:48	11:48 to 12:36	12:36 to 01:24	01:30 to 2:30	2:30 to 4:54	
MON	B.Sc. II (P) B_1			B.Sc. II (T)		B.Sc. II (P) B_2	
TUE	B.Sc. II (P) B_1			B.Sc. II (T)	M.Sc. I (T)	B.Sc. II (P) B_2	
WED	B.Sc III (P)C_1		B.Sc I (T)				
THUS	B.Sc III (P)C_1						
FRI	B.Sc I (P) A_1	B.Sc III (T)				I (P) A_2	
		7:30 to 8:18	8:18 to 9:06	9:16 to 10:04		10.04 to 12.28	12.28 to 2.52
SAT			B.Sc III (T)			B.Sc I(P) A_1	B.Sc I(P) A_2

Allotted Workload

Subject : CHEMISTRY

Year : 2022-2023

Sr. No.	Class	No. of periods per week			Unit Allotted
		Lectures	Tutorials	Practical	
1	B.Sc. I	01	---	4×3=12	01
2	B.Sc. II	02	---	4×3=12	02
3	B.Sc. III	02	---	2×3=06	02
4	M.Sc. I	01	---	---	01
4	**Total**	**06**	---	**30**	**06**

Available Teaching days in 2022-23

Odd SEM teaching Days (90) : 25/07/2022 to 22/10/2022 = 71 and 09/11/2022 to 30/11/2022=19 **Total=90**

Even SEM Teaching Days (90) : 01/02/2023 to 27/05/2023 = **90**

	JUL-22	**AUG-22**	**SEP-22**	**OCT-22**	**NOV-22**	**FEB-23**	**MAR-23**	**APR-23**	**MAY-23**
MON	01	04	04	03	03	04	04	04	03
TUE	01	03	04	03	03	04	03	03	04
WED	01	04	04	02	04	04	04	04	04
THUS	01	03	05	03	03	04	04	04	04
FRI	01	04	04	03	03	04	05	02	03
SAT	01	04	04	04	03	03	04	04	04
Total	**06**	**22**	**25**	**18**	**19**	**23**	**24**	**21**	**22**
	90					**90**			

Teaching Periods Available per month during the session 2022-23

Faculty : SCIENCE
CHEMISTRY

Subject :

		ODD SEMESTER						EVEN SEMESTER				
Class	Periods	JUL-22	AUG-22	SEP-22	OCT-22	NOV-22	Total	FEB-23	MAR-23	APR-23	MAY-23	Total
B.Sc I	Theory	01	04	04	02	04	**15**	04	04	04	04	16
	Practical	12	48	48	42	36	**186**	42	54	36	42	174
B.Sc II	Theory	02	07	08	06	06	**29**	08	07	07	07	29

	Practical	12	42	48	36	36	**174**	48	42	42	42	174
B.Sc III	Theory	02	08	08	07	06	31	07	09	06	07	29
	Practical	06	21	27	15	21	90	24	24	24	24	96
M.Sc. I	Theory	01	03	04	03	03	14	04	03	03	04	14

Syllabus:

Teaching Plan for Theory (First Semester)		**Class : B.Sc Part I**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	**Unit-I Periodicity of Elements**:	**15L**	
	Periodic properties: s and p block elements: Pauli's Exclusion Principle, Hund's rule of maximum multiplicity, Aufbau principle. Shapes of s and p orbitals. Electronic configuration for s and p block elements. Detailed discussion of the following properties of the elements, with reference to s and p-block. (a) Nuclear charge and number of shell and its variations (b) Atomic and ionic radii and their variations	**05L**	
	(d) oxidation states (e) Ionization potential, Successive ionization potential and its variations. (f) Electron affinity and its trends. (g) Electronegativity and its variations. Effect of ionization energy and electronegativity on different properties of elements namely metallic and non-metallic character, relative reactivity, oxidizing and reducing properties. Diagonal relationships: Li with Mg, B with Al. Abnormal behavior of nitrogen. P	**09L**	
	Unit Test	**01L**	
Teaching Plan for Practical (First Semester)		Class : B.Sc Part I	
Sr. No.	List of Practical/Laboratory Experiments/Activities etc	Lectures	Lectures

		Available	Utilized
		186L	
01	Preparation of Acetyl derivative of aromatic primary amine (aniline or toluidine).	15L	
02	Preparation of Benzanilide (Benzoylation).	15L	
03	Preparation of Benzoic acid from Benzamide (Hydrolysis).	15L	
04	Preparation of Benzoic acid from benzaldehyde (Oxidation).	15L	
05	Preparation of phenyl–azo–β–naphthol dye (Diazotisation)	15L	
06	Base catalysed Aldol Condensation (Synthesis of dibanzal propanone).	15L	
07	Preparation of p-nitroacetanilide from acetanilide.	15L	
08	Determination of surface tension of a given liquid using Stalagmometer	15L	
09	Determination of the parachor value of -CH2- group (methylene) using Stalagmometer	15L	
10	Determination of coefficient of viscosity of aqueous solution of ethanol or polymer at room temperature.	15L	
11	Determination of unknown percentage composition of given glycerol solution from standard 2%, 4%,6%,8% and 10% solutions of glycerol	18L	
12	Determination of the heat of solution of KNO3 (5% solution)	18L	

Teaching Plan for Theory (Second Semester) **Class : B.Sc Part I**

Sr. No.	**Topic to be covered**	**Lectures Available**	**Lectures Utilized**

01	**Unit-5 Crystalline state:**	**16L**	
	Crystalline state: Symmetry in crystal, plane of symmetry, axis of symmetry and point of symmetry. Law of constancy of interfacial angles. Elements of symmetry in cubic crystals. Laws of symmetry. Law of rational indices, Weiss and Miller indices of a lattice planes, calculation of interplanar distance d(h,k,l) from Miller indices in a cubic system.	**05L**	
	Seven crystal systems and fourteen Bravais lattices, Bravais lattices of cubic system. Simple cubic system (S.C.C.), body centered cubic system (B.C.C.) and face centered cubic system (F.C.C.). Calculation of number of constituent units in S.C.C., B.C.C. and F.C.C. Ratio of interplanar distances for 100, 110 and 111 lattice planes in S.C.C., B.C.C. and F.C.C. (No geometrical derivation). Derivation of Bragg's equation for X-ray diffraction, Bragg's X-ray spectrometer 10 method for the determination of crystal structure of NaCl and KCl. Anomalous behavior of KCl towards X-ray. Numerical.	**10L**	
	Unit test	**01L**	

Teaching Plan for Practical (Second Semester) **Class : B.Sc Part I**

Sr. No.	Topic to be covered	Lectures Available 174L	Lectures Utilized
01	Exercise I: Organic Qualitative Analysis **(05)** Complete analysis of simple organic compounds (like urea, thiourea, benzoic acid, Salicylic acid, oxalic acid, glucose, naphthalene, para-toluidine, benzamide, etc.) containing one or two functional groups involving following steps. i) Preliminary examination ii) Detection of elements iii) Detection of functional groups iv) Determination of melting point v) Preparation of derivative and determination of its melting point	42L	

	vi) Performance of spot test, if any .		
	1) Qualitative analysis of compound-1	18L	
	2) Qualitative analysis of compound-2	18L	
	3) Qualitative analysis of compound-3	18L	
	4) Qualitative analysis of compound-4	18L	
	5) Qualitative analysis of compound-5	18L	
02	Exercise II: Volumetric Analysis		
	6) To determine the strength of oxalic acid by titration with KMnO4.	6L	
	7) To determine strength of FAS by titration with KMnO4 using internal indicator.	6L	
	8) Determination of temporary hardness of water sample.	6L	
	9) Estimation of Zn++ ions by complexometric titration.	6L	
	10) Prepare 0.1NH2SO4 solution and find out its exact normality using NaOH as anintermediate solution and 0.1N oxalic acid as a standard solution.	6L	
	11) Determination of order of reaction of hydrolysis of methyl acetate by an acid.	6L	
	12) To study kinetics of saponification of ethyl acetate byNaOH	6L	

Teaching Plan for Theory (Third Semester) **Class : B.Sc. Part II**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized

	Unit II & IV	**29L**	
01	**UNIT-II**	**15L**	
	A) Volumetric Analysis: Introduction:- Volumetric analysis, titrant, titrate, end point, equivalence point, indicator etc. Requirements of volumetric analysis. Definition of standard solution, primary standard substance. Requirements of primary standard substance. Terms to express concentrations namely- molarity, normality, molality, mole fraction and percentage. (Simple numericals expected). (b) Acid-Base titrations:- Types of acid base titrations. pH variations during acid base titration. Acid base indicators. Modern theory (Quinoniod theory) of acid base indicators. Choice of suitable indicators for different acid base titrations. (c) Redox Titrations:- General principles involved in redox titrations (redox reactions, redox potentials, oxidant, reductant, oxidation number). Brief idea about use of KMnO4 , K2 Cr2 O7 as oxidants in acidic medium in redox titrations. Use of I2 in iodometry and iodimetry. Redox indicators-external and internal indicators. Use of starch as an indicator. Iodometric estimation of Cu (II).	**08L**	
	b) Gravimetric Analysis: Definition. Theoretical principles underlying various steps involved in gravimetric analysis with reference to estimation of barium as barium sulphate. Coprecipitation and post precipitation. (Definition, types and factors affecting)	**06L**	
	Unit Test	**01L**	
02	**UNIT-IV**	**14L**	
	A] Optical Isomerism: Element of symmetry, chirality, asymetric carbon atom, enantiomers, diastereoisomers, relative and absolute configurations, DL and RS nomenclature, racemisation and resolution (by chemical method).	**04L**	

	B] Geometrical Isomerism: Cis-trans & E-Z nomenclature, Methods of structure determination.	**03L**	
	C) Conformational Isomerism: Bayer's Strain theory and its limitations. Stability of cycloalkanes, conformational isomers of ethane, n-butane and cyclohexane, their energy level diagrams. Newman & Sawhorse projection formulae	**06L**	
	Unit Test	**01L**	

Teaching Plan for Practical (Third Semester) **Class : B.Sc. Part II**

Sr. No.	Topic to be covered	Lectures Available **174L**	Lectures Utilized
01	**EXERCISE I: a) Volumetric Analysis (07)**		
	1) Prepare 0.1N oxalic acid standard solution and find out the acid neutralizing capacity of an antacid using NaOH as an intermediate solution.	12L	
	2) Prepare 0.1N H_2SO_4 solution and find out its exact normality using NaOH as an intermediate solution and 0.1N oxalic acid as standard solution.	12L	
	3) To determine the strength of oxalic acid by titration with KMnO4.	12L	
	4) To determine percentage purity of Ferrous Ammonium Sulphate (FAS) by titration with $KMnO_4$.	12L	
	5) To determine strength of FAS by titration with $K_2Cr_2O_7$using internal indicator.	12L	
	6) To determine strength of $K_2Cr_2O_7$by titration with FAS using internal indicator.	12L	
	7) Estimation of copper (II) in commercial copper sulphate sample by iodometric titration	12L	
02	**b) Gravimetric Analysis (03):**		

	Estimation of Ba^{2+} as $BaSO_4$	12L	
	Estimation of Fe^{3+} as Fe_2O_3 using china and silica crucible	12L	
	Estimation of Ni^{2+} as Ni-DMG using sintered glass crucible	12L	
03	**EXERCISE II: Physical Chemistry Experiment (08)**		
	1) To determine refractive index by Abbe's refractometer.	6L	
	2) To construct phase diagram of phenol-water system and to determine consolute temperature for the system.	9L	
	3) To determine transition temperature of $MnCl_2.4H_2O$.	6L	
	4) To study kinetics of hydrolysis of methyl acetate catalyzed by acid.	6L	
	5) To study kinetics of saponification of ethyl acetate by NaOH. (Equal concentration)	9L	
	6) To determine partition coefficient of benzoic acid between benzene and water.	6L	
	7) To determine partition coefficient of iodine between CCl_4/Kerosene and water.	6L	
	8) To determine solubility of benzoic acid at different temperature and heat of solution.	6L	

Teaching Plan for Theory (Fourth Semester) **Class : B.Sc. Part II**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	Unit V & VI	***29L***	
01	**UNIT-V: Colligative Properties of Dilute Solutions**	***14L***	
	A) Defination and examples of colligative properties. Elevation of boiling point, thermodynamic derivation of the relationship between elevation of boiling point and molar mass of a non-volatile solute. Cotrell's method for determination of elevation of boiling point.	**06L**	

	B) Depression of freezing point, thermodynamic derivation of the relationship between depression of freezing point and molar mass of a non-volatile solute. Rast's method for determination of depression of freezing point. Abnormal behavior of solution. Van't Hoff's factor 'i'. Determination of degree of association and dissociation from Van't Hoff's factor. Numericals.	**07L**	
	Unit Test	**01L**	
02	**UNIT-VI Crystalline State**	**15L**	
	A) Symmetry in crystal, plane of symmetry, axis of symmetry and point of symmetry. Law of constancy of interfacial angles. Elements of symmetry in cubic crystals. Laws of symmetry. Law of rational indices, Weiss and Miller indices of a lattice planes, calculation of interplaner distance d(h,k,l) from Miller indices in a cubic system. Seven crystal systems and fourteen Bravais lattices, Bravais lattices of cubic system.	**07L**	
	B) Simple cubic system (S.C.C.), body centered cubic system (B.C.C.) and face centered cubic system (F.C.C.). Calculation of number of constituent units in S.C.C., B.C.C. and F.C.C. Ratio of interplaner distances for 100, 110 and 111 lattice plane in S.C.C., B.C.C. and F.C.C. (No geometrical derivation). Derivation of Bragg's equation for X-ray diffraction, Bragg's X-ray spectrometer method for the determination of crystal structure of NaCl and KCl. Anomalous behaviour of KCl towards X-ray. Numericals.	**07L**	
	UNIT TEST	**01L**	

Teaching Plan for Practical I (Fourth Semester) **Class : B.Sc. Part II**

Sr. No.	Topic to be covered	Lectures Available **174L**	Lectures Utilized
01	**EXERCISE I: Inorganic Estimation (06)**		
	1) Chromatographic separation of binary mixture containing Cu(II), Co(II) and Ni(II) ions by paper	15L	

	chromatography and determination of Rf values.		
	2) Estimation of Zn(II) by complexometric titration.	15L	
	3) To determine the strength of unknown calcium salt solution by complexometric titration.	15L	
	4) Estimation of hardness of water by complexometric titration.	15L	
	5) Colorimetric or spectrophotometric estimation of Cu(II) in commercial copper sulphate sample as ammonia complex.	15L	
	6) To determination of concentration of unknown $KMnO_4$ solution from standard solutions of $KMnO_4$ by calorimetrically or spectrophotometrically	15L	
02	**EXERCISE II: Organic Practical (07)**		
	1. Isolation of casein from milk.	12L	
	2. Isolation of nicotine from tobacco leaves.	12L	
	3. Isolation of caffeine from tea leaves.	12L	
	4. Isolation of lycopene from tomato juice.	12L	
	5. Estimation of glucose.	12L	
	6. Estimation of acetamide.	12L	
	7. Determination of equivalent weight of an organic acid	12L	

Teaching Plan for Theory (Fifth Semester) **Class : B.Sc. Part III**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	UNIT-V & VI	**31L**	
01	**UNIT-V Photochemistry**	**15L**	
	A) Photochemical and thermal reactions. Lambert's law - Statement and derivation. Beer's law - Statement and derivation. Reasons for deviation from Beer's law. Laws of photochemistry. Quantum yield of photochemical reaction. Reasons for high and low	**08L**	

	quantum yield. Experimental determination of quantum yield. Photosensitized reaction. Kinetics of photochemical decomposition of HI. Fluorescence and Phosphorescence. Selection rule for electronic transition. Internal conversion and inter-system crossing. Explanation of fluorescence and phosphorescence on the basis of Joblonski diagram. Chemiluminescence andBioluminescence with examples. Numericals.		
	B) Kinetics of photochemical decomposition of HI. Fluorescence and Phosphorescence. Selection rule for electronic transition. Internal conversion and inter-system crossing. Explanation of fluorescence and phosphorescence on the basis of Joblonski diagram. Chemiluminescence and Bioluminescence with examples. Numericals	**06L**	
	UNIT TEST	**01L**	
02	**UNIT-VI Molecular Spectroscopy**	**16L**	
	Electromagnetic radiation, characteristics of electromagnetic radiation in terms of wavelength, wave number, frequency and energy of photon. Spectrum of electromagnetic radiation. Types of spectra - Emission and absorption spectra, atomic and molecular spectra, line and band spectra Translational, vibrational, rotational and electronic motion. The degree of freedom in each motion. Energy level diagram of a molecule indicating electronic, vibrational and rotational transitions. Condition for pure rotational spectrum (i.e. microwave active molecules), selection rule for rotational transition. Derivation of expression for moment of inertia of a diatomic rigid rotor. Isotope effect. Applications of microwave spectroscopy for the determination of moment of inertia and bonding. Condition for exhibiting vibrational spectra (i.e. IR active molecule),	**07L**	
	Selection rule for vibrational transition. Vibrational energy levels of a simple harmonic oscillator. Zero-point energy, position of a spectral line. Determination of force constant of a covalent bond. Raman effect - Raman's spectrum of a molecule. Condition for	**08L**	

	exhibiting Raman spectrum (i.e. Raman active molecule), selection rule for rotational transitions. Pure rotational spectrum of diatomic molecule, vibrational Raman spectrum of a diatomic molecule. Numericals. rule for vibrational transition. Vibrational energy levels of a simple harmonic oscillator. Zero-point energy, position of a spectral line. Determination of force constant of a covalent bond. Raman effect - Raman's spectrum of a molecule. Condition for exhibiting Raman spectrum (i.e. Raman active molecule), selection rule for rotational transitions. Pure rotational spectrum of diatomic molecule, vibrational Raman spectrum of a diatomic molecule. Numericals.		
	UNIT TEST	**01L**	

Teaching Plan for Practical (Fifth Semester) **Class : B.Sc Part III**

Sr. No.	Topic to be covered	Lectures Available **90 L**	Lectures Utilized
01	**EXERCISE I: Inorganic Preparation (06)**		
	1. Preparation of tetraamminecopper (II)sulphate.	6L	
	2. Preparation of hexaamminenickel (II)chloride.	6L	
	3. Preparation of potassiumtrioxalate aluminate (III).	6L	
	4. Preparation of Prussian blue.	6L	
	5. Preparation of chrome alum.	6L	
	6. Preparation of sodium thiosulphate and dithionite. (Comment on VB structure, magnetic properties and color of 1, 2 and 3 complexes)	6L	
02	**EXERCISE II: Physical Chemistry Experiments (06)**		
	1. To determine strength of given HCl solution conductometrically.	9L	
	2. To determine strength of given CH_3COOH solution conductometrically.	9L	

	3. To determine strength of given HCl solution potentiometrically.	6L	
	4. To determine strength of HCl and CH_3COOH in a given mixture conductometrically.	9L	
	5. To determine redox potential of Fe^{+2}/Fe^{+3} system potentiometrically.	9L	
	6. To determine molecular weight by Rast's method.	6L	
	7. To determine specific rotation of optically active compound by Polarimeter.	6L	

Teaching Plan for Theory (Sixth Semester) **Class : B.Sc Part III**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	UNIT-V & VI	**29L**	
01	**UNIT-V Elementary Quantum Mechanics**	**14L**	
	A) Limitations of classical mechanics. Plank's quantum theory (postulates only). Photoelectric effect - Experiments, observation and Einstein's explanation. Compton effect and its explanation. (ii) de Broglie hypothesis of matter waves. de Broglie's equation. Heisenberg's uncertainty principle. (iii) Classical wave equation, derivation of time independent Schrodinger's wave equation in one-dimension and its extension to a three-dimensional space. Well behaved wave function, physical significance of wave function (Born interpretation).	**08L**	
	B) Application of Schrodinger wave equation to a particle in one- dimensional box and its extension to a three-dimensional box. Concept of atomic orbital. Numericals.	**05L**	
	Unit Test	**01L**	
02	**UNIT-VI Electrochemistry and Nuclear Chemistry**	**15L**	
	A) Electrochemistry: Types of electrode- Standard hydrogen electrode,	**07L**	

	Calomel electrode, Quinhydrone electrode and Glass electrode. Principle of Potentiometric titration. Study of acid-base, redox and precipitation titration. pH of a solution and pH scale. Determination of pH of a solution using hydrogen, quinhydrone and glass electrodes. Advantage and disadvantage of these electrodes. pH-metric titrations. Determination of pka of a weak acid by pH-metric measurement. Concentration cells - Types of concentration cells, concentration cell without transfer and determination of its emf. Numericals		
	B) Nuclear Chemistry: Shell model of a nucleus - Assumptions, evidences for existence of magic numbers, advantages and limitations. Liquid drop model of a nucleus - Assumptions, similarities between nucleus and liquid drop, advantages and limitations, explanation of nuclear fission reaction on the basis of liquid drop model. Nuclear force and its explanation on the basis of Meson theory. Characteristics of nuclear reaction, difference between nuclear and chemical reactions. Calculation of Q value of a nuclear reaction. Characteristics of nuclear fission reaction, fission yield. Fission reaction as an alternative source of energy. Nuclear fusion reaction - Characteristic of a nuclear fusion reaction. Thermonuclear reactions as a source of energy of sun and other stars. Fusion reactions as a potential future source of energy. Applications of radio isotopes in industry, agriculture, medicines and bio-sciences with two examples each. Numericals.	**07L**	
	UNIT TEST	**01L**	

Teaching Plan for Practical (Sixth Semester) **Class : B.Sc Part III**

Sr. No.	Topic to be covered	Lectures Available **96L**	Lectures Utilized
01	**EXERCISE I: Organic Chemistry Preparation (13)**		
	1. Estimation of formaldehyde.	6L	

	2. Estimation of glycine.	6L	
	3. Estimation of ascorbic acid (vitamine C).	6L	
	4. Estimation of phenol by bromination method.	6L	
	5. Estimation of aniline by bromination method.	6L	
	6. Estimation of urea by hypobromite method.	6L	
	7. Estimation of unsaturation by bromination method.	6L	
	8. Determination of iodine value of oil.	6L	
	9. Determination of equivalent weight of an ester by saponification.	6L	
	10. Separation of a mixture of methyl orange and methylene blue by thin layer chromatography (using benzene).	3L	
	11. Separation of a mixture of 2,4-dinitro phenyls of acetaldehyde and benzaldehyde by thin layer chromatography(using benzene : petroleum ether = 3:1).	6L	
	12. Separation of a mixture of dyes by thin layer chromatography (using cyclohexane:ethyl acetate = 8.5:1.5).	3L	
	13. Separation of a mixture of 2,4-dinitro phenyls of acetaldehyde and benzaldehyde by thin layer chromatography (using toluene: petroleum ether).	6L	
02	**EXERCISE II: Physical Chemistry Experiments (08)**		
	1. To determine dissociation constant of weak acid by conductometry.	3L	
	2. To determine dissociation constant of weak acid by potentiometry.	3L	
	3. To study potentiometric titration of KCl and $AgNO_3$.	3L	
	4. To determine dissociation constant of dibasic acid by pH-metry.	3L	

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	5. To verify Beer's Lambart's law using $KMnO_4$ /$K_2Cr_2O_7$.	3L	
	6. To determine pH of a soil sample by pH-meter.	3L	
	7. To determine solubility and solubility product of sparingly soluble salts conductometrically.	3L	
	8. To study strong acid and strong base titration by pH-metry. Distribution of Marks for Practical Examination	3L	

Teaching Plan for Practical (First Semester)		**Class : M.Sc Part I**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
1	**Analytical Chemistry** **Unit II: Separation techniques**	**14L**	
	A] Chromatography: Definition and Classification. Techniques used in Paper, Thin Layer and Column chromatography. Applications in qualitative and quantitative analysis.	**04L**	
	B] Ion exchange: Principle and technique. Types of ion exchangers. Ion exchange equilibria. Ion exchange capacity. Effect of complexing ions. Zeolites as ion-exchangers. Applications	**04L**	
	C] Solvent extraction: Principle and techniques. Distribution ratio and distribution coefficient. Factors affecting extraction efficiency: Ion association complexes, chelation, synergistic extraction, pH. Numericals based on multiple extractions. Role of chelating ligands, crown ethers, calixarenes and cryptands in solvent extraction. Introduction to Solid phase extraction (SPE) and Microwave assisted extraction (MAE), Applications	**05L**	
	Unit Test	**01L**	

Teaching Plan for Practical (Second Semester)		**Class : M.Sc Part I**	
Sr. No.	Topic to be covered	Lectures	Lectures

		Available	Utilized
1	**Analytical Chemistry** **Unit I: Modern Separation techniques**	**14L**	
	A] Gas Chromatography: Principle including concept of theoretical plates and van-Deemter equation. Instrumental set up- carrier gas, sampling system, column and detector. Types of columns, their advantages and limitations. Detectors in GC analysis. Temperature programmed GC. Factors affecting retention, peak resolution and peak broadening. B] Liquid chromatography: Principle, Instrumentation, Advantages and applications of HPLC. Types of columns and detectors. Principle and applications of size exclusion, gel permeation, ion retardation, normal phase and reverse phase chromatography. C] Supercritical fluid chromatography: Introduction and applications	**06L**	
	B] Liquid chromatography: Principle, Instrumentation, Advantages and applications of HPLC. Types of columns and detectors. Principle and applications of size exclusion, gel permeation, ion retardation, normal phase and reverse phase chromatography. C] Supercritical fluid chromatography: Introduction and applications	**04L**	
	C] Supercritical fluid chromatography: Introduction and applications	**03L**	
	Unit Test	**01L**	

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DEPARTMENT OF BOTANY

DEPRTMENTAL ACADEMIC CALENDAR 2022-23

ARTS & COMMERCE COLLEGE, WARWAT BAKAL

Department: Botany

ACADEMIC CALENDER 2022-23

1. I- Session : From: 1 July 2022 to 30 November 2022.
2. Diwali Vacation: From: 24 October 2022 to 8 November 2022.
3. II- Session : Fro: 23 January 2023 to 27 May 2023.
4. Summer Vacation: From: 29 May 2023 to 1 July 2023.

Days available during Academic Year 2022 - 2023

Sr. No.	Activity	Commencement	Cessation	Total Days
01	First Session	1 July 2022	30 November 2022.	110
02	Admission Process	1 July 2022	16 July 2022	14
03	Induction Programme (For Ist Year Students)	18 July 2022	23 July 2022	06
04	Teaching Days (Odd Semester)	25 July 2022	22 October 2022	90
05	First Term Vacation	24 October 2022	8 November 2022	16
06	Odd Semester University Examinations/Non-Instructional Days	1 December 2022	21 January 2023	45
07	Academic Session (Second Session)	23 January 2023	27 May 2023	98
08	Non Instructional Days for Recreation / Extra Curricular (NSS, Gathering etc)	23 January 2023	31 January 2023	07
09	Teaching Days (Even Semester)	1 February 2023	27 May 2023	91
10	Even Semester University Examination	29 May 2023	1 July 2023	29
11	Second Term Vacation	29 May 2023	1 July 2023	34

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Department: Botany

Vide the SGB Amravati University Gazette, following Public Holidays are declared for 2022 - 2023

Sr. No.	Public Holiday	Day & Date
1	Moharum	Tuesday, 09 August 2022
2	Rakshabandhan	Thursday, 11 August 2022
3	Independence Day	Monday, 15 August 2022
4	Parsi New Year (Shahenshahi)	Tuesday, 16 August 2022
5	Shri Ganesh Chaturthi	Wednesday, 31 August 2022
6	Anant Chaturdashi	Friday, 9 September 2022
7	Dasara	Wednesday, 5 October 2022
8	Republic Day	Thursday, 26 January 2023
9	Mahashiratri	Saturday, 18 February 2023
10	Holi (Second Day)	Tuesday, 7 March 2023
11	Gudhi Padwa	Wednesday, 22 March 2023
12	Shriram Navmi	Thursday, 30 March 2023
13	Mahavir Jayanti	Tuesday, 4 April 2023
14	Good Friday	Friday,7 April 2023
15	Dr. Babasaheb Ambedkar Jayanti	Friday,14 April 2023
16	Ramzan Id (Id-Ul-Fitar)	Saturday, 22 April 2023
17	Maharashtra Day	Monday, 1 May 2023
18	Buddha Pournima	Friday, 5 May 2023

PROGRAMS SCHEDULE (2022 - 23)

Sr. No.	Particulars	Date
01	Seed Ball Activity	13 August, 2022
02	Study Circle Formation	23* August 2022
03	National Nutrition week- 1. Exhibition of Wild Vegetables 2. Guest Lecture	1-7 September 2022
04	Wildlife week	1-7 October 2022
05	One Day Field Visit	22 October 2022
06	Sir Jagdish Chandra Bose Birth Anniversary	30 November, 2022
07	National Pollution prevention day	2 December 2022
08	International Day for Biological Diversity	29 December 2022
09	Flower Arrangement Competition	18 January 2023
10	World Wetland Day	2 February 2023
11	National Science Day	28 February 2023
11	Natural Colors Preparation	6 March 2023
12	Study Tour	Month of April 2023
13	Education Visit to various research Institute	Month of January/February 2023
14	Seminar	Month of November 2022
15	Group Discussion	23, 24, 25 September 2022
16	Class Test	Last week of every months

Mr. Santosh S. Mhasal
Head, Department of Botany

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Department of Botany
Perspective Plan for Curriculum Implementation 2022-2023

Teaching Plan for Theory (First Semester)		Class : B.Sc. Part I	
Sr. No.	Topic to be covered	Lectures Available	Duration
01	UNIT-I : Introduction to Microbial world	12	July-2022
02	UNIT-II: Cryptogams and Algae	12	Aug-2022
03	UNIT-III : Algae	12	Aug-2022
04	Unit-IV : Introduction to Fungi	12	Sept-2022
05	Unit-V : Fungi and Applied mycology	12	Oct-2022
06	Unit-VI : Phytopathology	12	Nov-2022

Teaching Plan for Practical (First Semester)		Class : B.Sc. Part I	
Sr. No.	Topic to be covered	Lectures Available	Duration
01	Preparation of temporary mount, identification with reason of following algal materials-Oedogonium, Hydrodictyon.	12	July-August 2022
02	Preparation of temporary mount, identification with reason of following algal materials- Vaucheria.	6	August 2022
03	Preparation of temporary mount, identification with reason of following algal materials- Sargassum.	6	September 2022
04	Study of genus Albugo & Uncinula.	6	September 2022
05	Study of genus Puccinia & Cercospora.	12	October 2022
06	Study of symptoms of fungal, viral, bacterial and Mycoplasmal diseases.	12	October 2022
07	Demonstration of Mushroom Cultivation Technology.	6	November 2022
08	Study of external and anatomy features of vegetative and reproductive parts of genera Funaria, Polytrichum and Sphagnum.	12	November 2022
09	Study of Pteridophyte external and anatomy features of vegetative and reproductive parts of genera – Osmunda&Selaginella.	12	November 2022
10	Study of fossil specimen.	6	November 2022

Teaching Plan for Theory (Second Semester)		Class : B.Sc. I	
Sr. No.	Topic to be covered	Lectures Available	Duration
01	UNIT-I : Bryophytes	12	Feb-2023
02	UNIT-II : Pteridophytes	12	Feb-2023

03	UNIT-III : Gymnosperms	12	March-2023
04	UNIT-IV: Morphology of Angiosperms (Vegetative)	12	March-April-2023
05	UNIT-V: Morphology of Angiosperms (Reprodutive)	12	April-2023
06	UNIT-VI: Utilization of Plants and medicinal plants	12	April-May-2023

Teaching Plan for Practical (Second Semester)			Class : B.Sc. Part I
01	Gymnosperms: Morphology and anatomy of the -Pinus.	12	February 2023
02	Preparation of double stained permanent mount of Pinus stem, needle.	12	February 2023
03	Detailed morphological study of types of root with its modifications.	18	March 2023
04	Detailed morphological study of types of leaf with its modifications.	18	March 2023
05	Study of Types of placentation.	12	April 2023
06	Morphology of plant parts used and medicinal plants prescribed in syllabi	18	April 2023

Teaching Plan for Theory (Third Semester)			Class : B.Sc. II
Sr. No.	Topic to be covered	Lectures Available	Duration
01	UNIT-I : Angiosperm Systematics and Biodiversity	14	July-2022
02	UNIT II: Angiosperm Systematics:	14	Aug-2022
03	UNIT III: Angiosperm Systematics	14	Aug-2022
04	UNIT IV: Anatomy	14	Sept-2022
05	UNIT V: Anatomy	14	Oct-2022
06.	UNIT VI: Embryology-	14	Nov-2022

Teaching Plan for Practical (Third Semester)			Class : B.Sc. II
Sr. No.	Topic to be covered	Lectures Available	Duration
01	Embryology of Angiosperms: Observation of wide range of flowers available in the locality and methods of their pollination.	12	July- 2022
02	Study through permanent slides of T.S. of anthers, microsporogenesis, L.S. of ovule, types of endosperms and embryo of Capsella .	12	August-2022
03	Mounting of T.S. of anthers, Pollen	12	September- 2022

	grains and pollinia.		
04	Anatomy of angiosperms : Preparation of double stained slides of root,stem,leaf (Dicot. & Monocot.)	18	September- 2022
05	Taxonomic description of family, Verbanaceae – *Lantana.* Malvaceae- *Hibiscus.* Fabaceae- *Crotalaria.* Caesalpinoidae- *Caesalpinea,* Asteraceae- *Tridax.* Apiaceae- *Corindrum.* Apocynaceae- *Vinca.* Asclepiadaceae-*Calatropis.* Solanaceae- *Datura* , Lamiaceae- *Oscimum.*	30	October-November-2022
06.	Group discussion, record book checking, certification	06	November-2022

Teaching Plan for Theory (Fourth Semester) Class : B.Sc. II

Sr. No.	Topic to be covered	Lectures Available	November-2022
01	Unit – I : Cell Biology	14	Feb-2023
02	Unit–II : Cell Biology Structure and functions : .	14	Feb-2023
03	Unit – III : Genetics	14	March-2023
04.	Unit–IV: Genetics	14	March-April-2023
05.	Unit – VGenetics	14	April-2023
06.	Unit – VI Biochemistry	14	April-May-2023

Teaching Plan for Practical (Fourth Semester) Class : B.Sc. II

Sr. No.	Topic to be covered	Lectures Available	Duration
01	Squash preparation for the study of various stages of mitosis	12	February 2023
02	Smear preparation for the study of various stages of meiosis.	12	February 2023
03	To prove Mendel's Monohybrid ratio.	12	February-March 2023
04	To prove Mendel's Dihybrid ratio.	12	March 2023
05	Problems based on Interaction of genes	24	March 2023
06	To demonstrate test for glucose in grapes, & sucrose in cane sugar / beet root.	06	April 2023

07	To demonstrate test for protein,lipid,starch	09	April 2023
08	To demonstrate the activity of enzyme amylase from germinating Wheat grains.	03	April 2023

Teaching Plan for Theory (Fifth Semester) Class : B.Sc. III

Sr. No.	Topic to be covered	Lectures Available	Duration
01	Unit – I : Plant Water Relations	14	July-2022
02.	Unit - II: Metabolism-	14	Aug-2022
03.	Unit - III: Metabolism and growth	14	Aug-2022
04.	Unit – IV: Plant responses	14	Sept-2022
05.	Unit – V: Ecology and Environment:	14	Oct-2022
06.	Unit – VI: Ecosystem:	14	Nov-2022

Teaching Plan for Practical (Fifth Semester) Class : B.Sc. III

Sr. No.	Topic to be covered	Lectures Available	Duration
01	To study the effect of temperature and organic solvent on permeability of plasma membrane.	06	July-August-2022
02	To determine the path of water (ascent of sap).	06	August-2022
03	To determine the rate of transpiration by Ganongs photometer.	06	August-2022
04	To determine rate of photosynthesis under varying quality of light and CO_2 concentration.	06	August-2022
05	Separation of chloroplast pigments by paper chromatography method.	06	September-2022
06	To study antagonism of salts.	03	September-2022
07	To study effect of IAA and Gibberellins on seed germination.	06	September-2022
08	To demonstrate exo and endosmosis.	03	September-2022
09	To demonstrate fermentation.	06	October-2022
10	To demonstrate transpiration by Bell jar.	06	October-2022
11	To demonstrate anaerobic respiration in germinating seeds.	06	October-2022
12	To demonstrate the phenomenon of nastic movement with help of *Mimosa pudica*	06	October-2022
13	Study of morphological and anatomical adaptations in hydrophytes – *Hydrilla* and *Nymphaea.*	06	October-November-2022
14	Study of morphological and anatomical adaptations in xerophytes - *Nerium, Casuarina.*	06	November-2022
15	Determination of pH of different soils and water samples by pH papers	06	November-2022
16	Study of meteorological instruments -Rain	06	November-2022

	gauge, Hygrometer.		
Teaching Plan for Theory (Sixth Semester)			Class : B.Sc. III
Sr. No.	Topic to be covered	Lectures Available	Duration
01	Unit-I : DNA the genetic material :	14	Feb-2023
02	Unit-II : Gene Structure and Expression - Concept of gene, Fine structure of Gene.	14	Feb-2023
03	Unit – III : Regulation of Gene Expression	14	March-2023
04	Unit-IV : Genetic Engineering -	14	March-April-2023
05	Unit : V Plant tissue Culture	14	April-2023
06	Unit-VI : Applications of Biotechnology	14	April-May-2023
Teaching Plan for Practical (Sixth Semester)			Class : B.Sc. III
Sr. No.	Topic to be covered	Lectures Available	Duration
01	Isolation of DNA by crude method	18	February 2023
02	Demonstration of Centrifugation	06	February 2023
03	Working Principle and application of Autoclave	06	February-March 2023
04	Working Principle and application of Laminar Air Flow	06	March 2023
05	Cleaning and Sterilization of Glassware	12	March 2023
06	Demonstration of technique of Micropropogation	12	April 2023
07	Preparation of Artificial Seed.	12	April 2023
08	Pollen viability test.	12	April 2023
09	Group discussion, record book checking, certification	06	April 2023

Departmental Academic Calendar (2022-23)

Sr. No.	Activity	Commencement	Cessation	Total Days
01	First Session	01/07/2022	30/11/2022	110
02	Admission Process	01/07/2022	16/07/2022	14
03	Teaching Days (Odd Semesters)	25/07/2022 09/11/2022	22/10/2022=71 30/11/2022=19	90
04	Induction Program for First Year Students	18/07/2022	23/07/2022	06
05	First TermVacation	24/10/2022	08/11/2022	16
06	Odd Semesters UniversityExam	01/12/2022	21/01/2023	45
07	Second Session	23/01/2023	27/05/2023	98
08	Teaching Days (EvenSemesters)	01/02/2023	04/05/2023	93
09	SecondTermVacation	29/05/2023	01/07/2023	34
10	Even Semesters University Exam	06/05/2023	10/06/2023	--
11	Commencement of next Academic session 2022-23	03/07/2023		

Sr. No.	Public Holiday	Day & Date
01	Moharum	Tuesday, 9/08/2022
02	Rakshabandhan	Thursday, 11/08/2022
03	Independence Day	Monday, 15/08/2022
04	Parsi New Year (Shahenshahi)	Tuesday, 16/08/2022
05	Shri Ganesh Chaturthi	Wednesday, 31/08/2022
06	Anant Chaturdashi	Friday, 09/09/2022
07	Dasara	Wednesday, 05/10/2022
08	Republic Day	Thursday, 26/01/ 2023
09	Mahashivratri	Saturday, 18/02/2023
10	Holi (Second Day)	Tuesday, 07/03/2023
11	Gudhi Padwa	Wednesday, 22/03/ 2023
12	Shriram Navmi	Thursday, 30/03/2023
13	Mahavir Jayanti	Tuesday, 04/04/2023
14	Good Friday	Friday, 07/04/2023
15	Dr. B. A. Jayanti	Friday, 14/04/2023
16	Ramzan Id (Id-Ul-Fitar)	Saturday, 22/04/20243
17	Maharashtra Day	Monday, 01/05/2023
18	Buddha Pournima	Friday, 05/05/2023

ARTS AND COMMERCE COLLEGE

Warvat (Bakal) ,Dist :- Buldana

Department of Botany

Teaching Plan for Curriculum Implementation 2022-23

S.S.Mhasal

Teaching Plan for Theory (First Semester)		Class : B.Sc. Part I	
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	**Unit-IV : Introduction to Fungi**	16	July 2022 to September 2022
02	**Unit-V : Fungi & Applied Mycology**	15	September 2022 -October 2022
03	**Unit-VI : Phytopathology**	15	October 2022 to November 2022

Teaching Plan for Practical (First Semester)		Class : B.Sc. Part I	
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01.	Study of types of bacteria from temporary / permanent slides / photographs.	06	July 2022
02	Study of Bacterial Staining (Gram staining)	06	August 2022
03.	Study of TMV from Models/ Photographs.	03	August 2022
04.	Algae - Preparation of temporary mount, identification with reasons of following algal materials : *Nostoc, Oedogonium, Chara, Vaucheria, Ectocarpus, Batrachospermum*	24	August 2022-Sep.2022
05.	**Fungi and Plant Pathology :** *1.* Study of following Genera - *Albugo, Rhizopus, Aspergillus. Puccinia, Cercospora,*	12	Sep.2022
06.	Study of Crustose, Fruticose and Foliose lichen.	12	Sep.2022
07.	Study of symptoms of fungal, viral, bacterial diseases.	18	Oct. 2022
08.	Photographic herbarium of diseased plant parts from local region	18	Nov.2022
09.	**Addition al Activitie s** **1.** Botanical Excursion (short/long) **2.** Visit to any biodiversity-rich area to study the plant diversity in natural habitat. The botanical excursion is compulsory for all students and the report of the excursion should be submitted at the time of		

10.	practical examination **Submission** 1. Photographic herbarium of diseased plant plants. 2. Tour reports or field visit report		

Teaching Plan for Theory (Second Semester) Class : B.Sc. I			
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	**UNIT-IV: Morphology Of Angiosperms (Vegetative)**	12	Feb.2023
02	**UNIT-V: Morphology Of Angiosperms (Reproductive)**	14	March 2023
03	**UNIT-VI:Utilization of Plants & Medicinal Plants**	15	April 2023- May 2023

Teaching Plan for Practical (Second Semester)		**Class : B.Sc. I**	
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	Bryophyta: Study of morphology and anatomy of vegetative and reproductive parts of following genera – *Marchantia and Funaria*	12	Feb. 2023
02	Pteridophyta: Study of morphology and anatomy of vegetative and reproductive parts of following genera – *Equisetum and Marsilea*	12	Feb. 2023
03	Gymnosperms: Study of morphology and anatomy of vegetative and reproductive parts of following genera – *Pinus and Gnetum*	12	March. 2023
04	Morphology: Detail morphological study of following types of plant parts - Root, Stem, Leaves, Inflorescence, Flower, Placentation and Fruits	24	March. 2023
05	Utilization of plants: Morphology varieties and economic importance of following plants i) Food plant : Wheat ii) Oil yielding plant: Groundnut iii) Fiber yielding : Cotton	12	April-. 2023
06	Medicinal plants- *Adhatoda vasica, Asparagus racemosus, Catharanthus roseus, Ocimum sanctum, Rauwolfia serpentina, Withania somnifera, Tinospora cordifolia*	06	May 2023
07	Botanical Excursion (short/long) Visit to any biodiversity rich area to study the plant diversity in natural habitat. The botanical excursion is compulsory for all students and the report of excursion should be submitted at the time of practical examination.		

	Photographic collection of bryophytic, pteridophytic and gymnospermic plants specimens		
08	1. Photographic herbarium of Bryophytes, Pteridophytes, Gymnosperms etc. 2. Botanical excursion report		

Teaching Plan for Practical (Third Semester) **Class : B.Sc. II**

Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	Embryology of Angiosperms: Observation of wide range of flowers available in the locality and methods of their pollination.	09	July 2022
02	Study through permanent slides of T.S. of anthers, microsporogenesis, L.S. of ovule, types of endosperms and embryo of Capsella .	15	August 2022
03	Mounting of T.S. of anthers, Pollen grains and pollinia.	15	August 2022
04	Anatomy of angiosperms : Preparation of double stained slides of root. (Dicot. & Monocot.)	18	August 2022 - Sep.2022
05	Anatomy of angiosperms : Preparation of double stained slides of stem. (Dicot. & Monocot.)	12	Sep.2022
06	Anatomy of angiosperms : Preparation of double stained slides of leaf. (Dicot. & Monocot.)	12	Sep.2022
07	Taxonomic description of family,**Verbanaceae** – *Lantana.*	09	Sep.2022
08	Taxonomic description of family,**Malvaceae**- *Hibiscus.*	03	Sep.2022
09	Taxonomic description of family,**Fabaceae**-*Crotalaria.*	06	Oct.2022
10	Taxonomic description of family,**Caesalpinoidae**- *Caesalpinea.*	06	Oct.2022
11	Taxonomic description of family,**Asteraceae**- *Tridax.*	06	Oct.2022
12	Taxonomic description of family,**Apiaceae**-*Corindrum.*	06	Oct.2022- Nov.2022
13	Taxonomic description of family,**Apocynaceae**- *Vinca.*	06	Nov.2022
14	Taxonomic description of family,**Asclepiadaceae**-*Calatropis.*	06	Nov.2022
15	Taxonomic description of family,**Solanaceae**- *Datura.*	06	Nov.2022
16	Taxonomic description of family,**Lamiaceae**-*Oscimum.*	06	Nov.2022
17	Group discussion, record book checking, certification	06	Nov.2022

Teaching Plan for Practical (Fourth Semester)		Class : B.Sc. II	
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	Squash preparation for the study of various stages of mitosis	30	Feb.2023
02	Smear preparation for the study of various stages of meiosis.	30	Feb.2023
03	To prove Mendel's Monohybrid ratio.	36	March 2023
04	To prove Mendel's Dihybrid ratio.	33	March 2023
05	Problems based on Interaction of genes	30	April 2023
06	To demonstrate test for glucose in grapes, & sucrose in cane sugar / beet root.	27	April 2023
07	To demonstrate test for protein.	03	April 2023
08	To demonstrate the lipid test in oily seeds.	03	May2023
09	To demonstrate the test for starch / cellulose.	03	May2023
10	To demonstrate the activity of enzyme amylase from germinating Wheat grains.	03	May2023
Teaching Plan for Theory (Fifth Semester)		Class : B.Sc. III	
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	**Plant Water Relations**	15	July 2022- Nov 2022
Teaching Plan for Practical (Fifth Semester)		Class : B.Sc. III	
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	To study the effect of temperature and organic solvent on permeability of plasma membrane.	03	July 2022
02	To determine the path of water (ascent of sap)	03	August 2022
03	To determine the rate of transpiration by Ganongs photometer.	03	August 2022
04	To determine rate of photosynthesis under varying quality of light and CO2 concentration.	06	August 2022
05	Separation of chloroplast pigments by paper chromatography method.	03	September 2022
06	To study antagonism of salts.	03	September 2022
07	To study effect of IAA and Gibberellins on	03	September 2022

	seed germination.		
08	To demonstrate exo and endosmosis.	03	September 2022
09	To demonstrate fermentation.	03	Oct.2022
10	To demonstrate transpiration by Bell jar.	03	Oct.2022
11	To demonstrate anaerobic respiration in germinating seeds.	03	Oct.2022
12	To demonstrate the phenomenon of nastic movement with help of *Mimosa pudica*	03	Nov.2022
13	Study of morphological and anatomical adaptations in hydrophytes – *Hydrilla*and*Nymphaea*. Determination of pH of different soils and water samples by pH papers	03	Nov.2022
14	Study of morphological and anatomical adaptations in xerophytes - *Nerium, Casuarina.* Study of meteorological instruments -Rain gauge, Hygrometer.	03	Nov.2022

Teaching Plan for Theory(Sixth Semester) **Class : B.Sc. III**

Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	**Unit-I : DNA the genetic material :**	13	Feb.2023 - May.2023

Teaching Plan for Practical (Sixth Semester) **Class : B.Sc. III**

Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	Isolation of DNA by crude method	06	Feb
02	Demonstration of Centrifugation	03	Feb
03	Working Principle and application of Autoclave	06	Feb-2023-March.2023
04	Working Principle and application of Laminar Air Flow	06	March.2023
05	Cleaning and Sterilization of Glassware	06	March.2023
06	Demonstration of technique of Micropropogation	03	April.2023
07	Preparation of Artificial Seed.	06	April.2023
08	Pollen viability test.	03	April.2023
09	Group discussion, record book checking, certification	03	May.2023

Time Table

Stream : Science

Subject : Botany

Name of Faculty: **Dr. Dnyaneshwar K. Sherkar**

Period	1	2	3	4	5
Day / Time	08:30am-10:54am	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	02:30pm-04:54pm
MON	I (P)			II (T)	I (P)
TUE			II (T)		
WED		II (T)			II (P)
THUS	II (P)				
FRI					III (P)
Day / Time	07:30am-08:28am	08:28 am to 09:16am	09:16 am to 10:04am		11:40am-02:04pm
SAT			III (T)		III (P)

Allotted Workload

Subject :Botany

Year : 2022-23

Sr. No.	Class	No. of periods per week		Paper Allotted
		Lectures	Practical	
1	B.Sc. I	00	06	
2	B.Sc. II	03	06	01
3	B.Sc. III	01	06	01

Total Workload per week **(UG)** (L+P):- 04 (L) + 18 (P) = 22 (17 hrs. 36 min.)

Teaching Periods Available per month during the session 2022-23

Stream: Science

Subject :Botany

		ODD SEMESTER						EVEN SEMESTER				
Class	Periods	July-2022	Aug-2022	Sept-2022	Oct-2022	Nov-2022	Total	FEB-2023	MAR - 2023	APR - 2023	MAY-2023	Total
BSc I	Theory	00	00	00	00	00	00	00	00	00	00	00
	Practical	06	24	24	18	18	90	36	36	36	09	117
BSc II	Theory	03	11	12	08	10	44	16	17	17	03	53
	Practical	06	24	27	15	21	93	12	15	12	03	42
BSc III	Theory	01	04	04	04	03	16	04	04	05	00	13
	Practical	06	24	24	21	18	93	24	27	27	00	78

Teaching Plan for Practical (First Semester)		Class : B.Sc. Part I	
Sr. No.	Topic to be covered	Lectures Available	Duration
01	**ALGAE :-** Preparation of temporary mount, identification with reason of following algal materials-Oedogonium, Hydrodictyon.	24	July-August 2022
02	Preparation of temporary mount, identification with reason of following algal materials- Vaucheria.	12	August 2022
03	Preparation of temporary mount, identification with reason of following algal materials- Sargassum.	12	September 2022
04	**FUNGI AND PLANT PATHOLOGY** Study of genus Albugo & Uncinula.	18	September 2022
05	Study of genus Puccinia & Cercospora.	18	October 2022
06	Study of symptoms of fungal, viral, bacterial and Mycoplasmal diseases.	18	October 2022
07	Demonstration of Mushroom Cultivation Technology.	06	November 2022
08	**BRYOPHYTES** Study of external and anatomy features of vegetative and reproductive parts of genera Funaria, Polytrichum and Sphagnum.	12	November 2022
09	**PTERIDOPHYTES** Study of Pteridophyte external and anatomy features of vegetative and reproductive parts of genera – Osmunda&Selaginella.	06	November 2022

10	Study of fossil specimen.	06	November 2022
Teaching Plan for Practical (Second Semester)		**Class : B.Sc. I**	
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	Gymnosperms: Morphology and anatomy of the -Pinus.	24	February 2023
02	Preparation of double stained permanent mount of Pinus stem, needle.	24	February 2023
03	Detailed morphological study of types of root with its modifications.	24	March 2023
04	Detailed morphological study of types of leaf with its modifications.	18	March 2023
05	Study of Types of placentation.	12	April 2023
06	Morphology of plant parts used and medicinal plants prescribed in syllabi	12	April 2023
07	Record Book checking	03	April 2023
Teaching Plan for Theory (Third Semester)			**Class : B.Sc. II**
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	**UNIT IV: Anatomy**	16	July-August-2022
02	**UNIT V: Anatomy**	15	September-October-2022
03	**UNIT VI : Embryology-**	15	October-November-2022
Teaching Plan for Practical (Third Semester)		**Class : B.Sc. II**	
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	Study through permanent slides of T.S. of anthers, microsporogenesis, L.S. of ovule, types of endosperms and embryo of Capsella .	06	July-August- 2022
02	Anatomy of angiosperms : Preparation of double stained slides of root. (Dicot. & Monocot.)	06	August-2022
03	Anatomy of angiosperms : Preparation of double stained slides of leaf. (Dicot. & Monocot.)	06	August-September- 2022
04	Taxonomic description of family,**Malvaceae-** *Hibiscus.*	06	September- 2022
05	Taxonomic description of family,**Caesalpinoidae-** *Caesalpinea.*	06	October-2022
06	Taxonomic description of family,**Apiaceae-** *Corindrum.*	06	October-2022
07	Taxonomic description of family,**Asclepiadaceae-** *Calatropis.*	03	November-2022
08	Taxonomic description of family,**Lamiaceae-***Oscimum.*	03	November-2022
09	Practical record checking, certification, group discussion	03	November-2022
Teaching Plan for Theory (Fourth Semester)		**Class : B.Sc. II**	

Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	**Unit–IV: Genetics**	*18*	February-March 2023
02	**Unit – V Genetics**	17	March-April 2023
03	**Unit – VI Biochemistry**	18	April-May 2023
Teaching Plan for Practical (Fourth Semester)		**Class : B.Sc. II**	
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	Squash preparation for the study of various stages of mitosis	6	February 2023
02	Smear preparation for the study of various stages of meiosis.	3	February 2023
03	To prove Mendel's Monohybrid ratio.	06	February-March 2023
04	To prove Mendel's Dihybrid ratio.	06	March 2023
05	Problems based on Interaction of genes	09	March 2023
06	To demonstrate test for glucose in grapes, & sucrose in cane sugar / beet root.	03	April 2023
07	To demonstrate test for protein.	03	April 2023
08	To demonstrate the lipid test in oily seeds.	03	April 2023
09	To demonstrate the activity of enzyme amylase from germinating Wheat grains.	03	April 2023
Teaching Plan for Theory (Fifth Semester)			**Class : B.Sc. III**
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	**Unit – IV: Plant responses**	16	July-November-2022
Teaching Plan for Practical (Fifth Semester)			**Class : B.Sc. III**
Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	To study the effect of temperature and organic solvent on permeability of plasma membrane.	06	July-August-2022
02	To determine the path of water (ascent of sap).	06	August-2022
03	To determine the rate of transpiration by Ganongs photometer.	06	August-2022
04	To determine rate of photosynthesis under varying quality of light and CO_2 concentration.	06	August-2022
05	Separation of chloroplast pigments by paper chromatography method.	06	September-2022
06	To study antagonism of salts.	03	September-2022
07	To study effect of IAA and Gibberellins on seed germination.	03	September-2022
08	To demonstrate exo and endosmosis.	03	September-2022
09	To demonstrate fermentation.	03	October-2022
10	To demonstrate transpiration by Bell jar.	03	October-2022
11	To demonstrate anaerobic respiration in germinating seeds.	03	October-2022
12	To demonstrate the phenomenon of nastic movement with	06	October-2022

	help of *Mimosa pudica*		
13	Study of morphological and anatomical adaptations in hydrophytes – *Hydrilla*and*Nymphoea.*	06	October-November-2022
14	Study of morphological and anatomical adaptations in xerophytes - *Nerium, Casuarina.*	06	November-2022
15	Determination of pH of different soils and water samples by pH papers	06	November-2022
16	Study of meteorological instruments -Rain gauge, Hygrometer.	03	November-2022
17	Practical record checking, certification, group discussion	03	November-2022

Teaching Plan for Theory(Sixth Semester) **Class : B.Sc. III**

Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	**Unit-IV : Genetic Engineering -**	13	February to May- 2023

Teaching Plan for Practical (Sixth Semester) **Class : B.Sc. III**

Sr. No.	Topic to be covered	Lectures Availabl e	Duration
01	Isolation of DNA by crude method	12	February 2023
02	Demonstration of Centrifugation	06	February 2023
03	Working Principle and application of Autoclave	12	February-March 2023
04	Working Principle and application of Laminar Air Flow	12	March 2023
05	Cleaning and Sterilization of Glassware	06	March 2023
06	Demonstration of technique of Micropropogation	06	April 2023
07	Preparation of Artificial Seed.	12	April 2023
08	Pollen viability test.	12	April 2023

Time Table:

Name: Dr. Kishor B. Theng

Faculty: SCIENCE Subject: BOTANY

Period	1	2	3	4	5	6
	Practical	Theory				Practical
Day/ Time	8:30 to 10:54	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	1:34 to 2:22	2:30 to 4:54
MON	I (Pract.) Batch:(A+B)		I (T)			
TUE		I (T)				I (Pract.) Batch:(C+D)
WED	II (Pract.) Batch:(A+B)	I (T)				
THUS		III(T)				II (Pract.) Batch: (C+ D+E)

FRI	III(Pract): A+B			III(T)		
		08.00-08.48	08.48-09:36	09:36- 10:24	10:34-12:58	12:58 -03:22
SAT						III(Pract): C+D

Allotted Workload

Subject: BOTANY

Year: 2022-23

Sr. No.	Class	Work load		
		Lecture (Theory)	Practical	Paper Allotted
1	B.Sc. - I	03	2 × 3 = 06	1
2	B.Sc. – II	--	2 × 3 = 06	-
3	B.Sc. - III	02	2 × 3 = 06	1

Total Workload per week (Th +Pract.): 05 (The) + 18 (Pract.) = 23 (18.24 Hrs.).

Teaching Periods Available per month during the session 2022-23

Faculty: SCIENCE

Subject: BOTANY

		ODD SEMESTER						EVEN SEMESTER				
Class	Periods	JUL-2022	AUG - 2022	SEP-2022	OCT - 2022	NOV - 2022	Total	FEB-2023	MAR-2023	APR - 2023	May-2023	Total
BSc-I	Theory	03	11	12	08	10	**44**	16	17	17	**03**	**53**
	Practical	06	**21**	**24**	**18**	**18**	**87**	**24**	**21**	**21**	**06**	**72**
BSc –II	Theory	--	--	--	--	--	--	--	--	--	--	--
	Practical	06	24	27	15	21	**93**	**36**	**36**	**39**	**06**	**117**
BSc- III	Theory	02	08	10	06	06	**32**	08	09	06	01	**24**
	Practical	**06**	**24**	**27**	**21**	**24**	**102**	**21**	**27**	**18**	--	**66**

Teaching Plan for Theory (First Semester)			Class : B.Sc. Part I
Sr. No.	Topic to be covered	Lectures Available	Duration
01	**UNIT-I : Introduction to Microbial World**	14	July 2022 to August 2022

02	**UNIT-II: Cyanobacteria & Algae**	15	September 2022 to October 2022
03	**UNIT-III : Algae**	15	October 2022 to November 2022

Teaching Plan for Practical (First Semester) **Class : B.Sc. Part I**

Sr. No.	Topic to be covered	Lectures Available	Duration
01	Study of types of bacteria from temporary / permanent slides / photographs.	06	July 2022
02	Study of Bacterial Staining (Gram staining)	06	August 2022
03	Study of TMV from Models/ Photographs.	03	August 2022
04	Algae - Preparation of temporary mount, identification with reasons of following algal materials : *Nostoc, Oedogonium, Chara, Vaucheria, Ectocarpus, Batrachospermum*	24	August 2022 to September 2022
05	**Fungi and Plant Pathology :** *1.* Study of following Genera - *Albugo, Rhizopus, Aspergillus. Puccinia, Cercospora,*	15	September 2022 to October 2022
06	Study of Crustose, Fruticose and Foliose lichen.	12	October 2022
07	Study of symptoms of fungal, viral, bacterial diseases.	12	October 2022 to November 2022
08	Photographic herbarium of diseased plant parts from local region	09	November 2022
09	**Additional Activities** **1.** Botanical Excursion (short/long) **2.** Visit to any biodiversity-rich area to study the plant diversity in natural habitat. The botanical excursion is compulsory for all students and the report of the excursion should be submitted at the time of practical examination	--	November 2021
10	**Submission** 1. Photographic herbarium of diseased plant plants. 2. Tour reports or field visit report	--	November 2021

Teaching Plan for Theory (Second Semester) Class: B.Sc. I

Sr. No.	Topic to be covered	Lectures Available	Duration
01	**UNIT-I : Bryophytes**	17	February 2023 to March 2023
02	**UNIT-II : Pteridophytes**	18	March 2023 to April 2023
03	**UNIT-III : Gymnosperms and Paleobotany**	18	April 2023 to May 2023

Teaching Plan for Practical (Second Semester) **Class: B.Sc. I**

Sr. No.	Topic to be covered	Lectures Available	Duration

01	Bryophyta: Study of morphology and anatomy of vegetative and reproductive parts of following genera – *Marchantia and Funaria*	09	February 2023
02	Pteridophyta: Study of morphology and anatomy of vegetative and reproductive parts of following genera – *Equisetum and Marsilea*	09	February 2023
03	Gymnosperms: Study of morphology and anatomy of vegetative and reproductive parts of following genera – *Pinus and Gnetum*	09	February 2023 and March 2023
04	Morphology: Detail morphological study of following types of plant parts - Root, Stem, Leaves, Inflorescence, Flower, Placentation and Fruits	12	March 2023
05	Utilization of plants: Morphology varieties and economic importance of following plants i) Food plant : Wheat ii) Oil yielding plant: Groundnut iii) Fiber yielding : Cotton	09	March 2023 to April 2023
06	Medicinal plants- *Adhatoda vasica, Asparagus racemosus, Catharanthus roseus, Ocimum sanctum, Rauwolfia serpentina, Withania somnifera, Tinospora cordifolia*	12	April 2023
07	Botanical Excursion (short/long) Visit to any biodiversity rich area to study the plant diversity in natural habitat. The botanical excursion is compulsory for all students and the report of excursion should be submitted at the time of practical examination. Photographic collection of bryophytic, pteridophytic and gymnospermic plants specimens	06	April 2023
08	1. Photographic herbarium of Bryophytes, Pteridophytes, Gymnosperms etc. 2. Botanical excursion report	06	May 2023

Teaching Plan for Practical (Third Semester)		Class : B.Sc. II	
Sr. No.	Topic to be covered	Lectures Available	Duration
01	Embryology of Angiosperms: Observation of wide range of flowers available in the locality and methods of their pollination.	09	July 2022
02	Study through permanent slides of T.S. of anthers, microsporogenesis, L.S. of ovule, types of endosperms and embryo of Capsella .	09	July 2022 to August 2022
03	Mounting of T.S. of anthers, Pollen grains and pollinia.	06	August 2022
04	Anatomy of angiosperms : Preparation of	06	August 2022

	double stained slides of root. (Dicot. & Monocot.)		
05	Anatomy of angiosperms : Preparation of double stained slides of stem. (Dicot. & Monocot.)	06	September 2022
06	Anatomy of angiosperms : Preparation of double stained slides of leaf. (Dicot. & Monocot.)	06	September 2022
07	Taxonomic description of family,Verbanaceae – *Lantana.*	06	September 2022
08	Taxonomic description of family,Malvaceae-*Hibiscus.*	06	September 2022
09	Taxonomic description of family,Fabaceae-*Crotalaria.*	06	September 2022 to October 2022
10	Taxonomic description of family,Caesalpinoidae- *Caesalpinea.*	06	October 2022
11	Taxonomic description of family,Asteraceae-*Tridax.*	06	October 2022
12	Taxonomic description of family,Apiaceae-*Corindrum.*	06	November 2022
13	Taxonomic description of family,Apocynaceae-*Vinca.*	03	November 2022
14	Taxonomic description of family,Asclepiadaceae-*Calatropis.*	03	November 2022
15	Taxonomic description of family,Solanaceae-*Datura.*	03	November 2022
16	Taxonomic description of family,Lamiaceae-*Oscimum.s*	03	November 2022
17	Record checking, certification & group discussion	03	November 2022

Teaching Plan for Practical (Fourth Semester) **Class : B.Sc. II**

Sr. No.	Topic to be covered	Lectures Available	Duration
01	Squash preparation for the study of various stages of mitosis	12	February 2023
02	Smear preparation for the study of various stages of meiosis.	12	February 2023
03	To prove Mendel's Monohybrid ratio.	12	February 2023
04	To prove Mendel's Dihybrid ratio.	12	March 2023
05	Problems based on Interaction of genes	30	March 2023 to April 2023
06	To demonstrate test for glucose in grapes, & sucrose in cane sugar / beet root.	12	April 2023
07	To demonstrate test for protein.	12	April 2023

08	To demonstrate the lipid test in oily seeds.	06	April 2023
09	To demonstrate the test for starch / cellulose.	06	April 2023 to May 2023
10	To demonstrate the activity of enzyme amylase from germinating Wheat grains.	03	May 2023

Teaching Plan for Theory (Fifth Semester) **Class : B.Sc. III**

Sr. No.	Topic to be covered	Lectures Available	Duration
01	**Unit - II: Metabolism-**	16	July 2022 to September 2022
02	**Unit - III: Metabolism and growth**	16	September 2022 to November 2022

Teaching Plan for Practical (Fifth Semester) **Class : B.Sc. III**

Sr. No.	Topic to be covered	Lectures Available	Duration
01	To study the effect of temperature and organic solvent on permeability of plasma membrane.	12	July 2022 to August 2022
02	To determine the path of water (ascent of sap)	12	August 2022
03	To determine the rate of transpiration by Ganongs photometer.	12	August 2022 to September 2022
04	To determine rate of photosynthesis under varying quality of light and CO2 concentration.	06	September 2022
05	Separation of chloroplast pigments by paper chromatography method.	12	September 2022
06	To study antagonism of salts.	03	September 2022
07	To study effect of IAA and Gibberellins on seed germination.	03	October2022
08	To demonstrate exo and endosmosis.	03	October2022
09	To demonstrate fermentation.	03	October2022
10	To demonstrate transpiration by Bell jar.	03	October2022
11	To demonstrate anaerobic respiration in germinating seeds.	03	October2022
12	To demonstrate the phenomenon of nastic movement with help of *Mimosa pudica*	06	October2022
13	Study of morphological and anatomical adaptations in hydrophytes – *HydrillaandNymphaea.*	06	November 2022
14	Study of morphological and anatomical adaptations in xerophytes –*Nerium, Casuarina.*	06	November 2022
15	Determination of pH of different soils and water samples by pH papers	06	November 2022
16	Study of meteorological instruments –Rain gauge, Hygrometer.	03	November 2022
17	Record checking, certification & group	03	November 2022

	discussion		
Teaching Plan for Theory (Sixth Semester)			**Class : B.Sc. III**
Sr. No.	Topic to be covered	Lectures Available	Duration
01	**Unit-II : Regulation of Gene Expression.**	12	February 2023 to March 2023
02	**Unit-VI : Applications of Biotechnology.**	12	March 2023 to May 2023
Teaching Plan for Practical (Sixth Semester)			**Class : B.Sc. III**
Sr. No.	Topic to be covered	Lectures Available	Duration
01	Isolation of DNA by crude method	12	February 2023
02	Demonstration of Centrifugation	06	February 2023
03	Working Principle and application of Autoclave	06	February 2023 to March 2023
04	Working Principle and application of Laminar Air Flow	06	March 2023
05	Cleaning and Sterilization of Glassware	12	March 2023
06	Demonstration of technique of Micropropogation	06	March 2023
07	Preparation of Artificial Seed.	06	April 2023
08	Pollen viability test.	12	April 2023

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ARTS & COMMERCE COLLEGE

WARVAT BAKAL DIST- BULDANA

DEPARTMENT OF ZOOLOGY

DEPRTMENTAL ACADEMIC CALENDAR 2022-23

ARTS AND COMMERCE COLLEGE

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Department of Zoology

Perspective Plan for Curriculum Implementation 2022-23

B.Sc Part I SEM I		
Unit	Available Lectures	Duration
I. Classification of non-chordate and phylum protozoa	15 period	Sept. 22
II. Phylum Porifera and phylum Coelenterate	13 periods	Sept. 22
III Phylum Platyhelminthes and phylum Aschelminths	12 periods	Oct. 22
IV Phylum Annelida and Arthropoda	14periods	Oct. 22
V phylum Mollusca and Phylum Echinodermata	15 periods	Nov. 22
VI Hemichordata, coral Reefs, Parasitic Adaptation in Helminth	15Periods	Dec. 22
B.Sc. Part II SEM III		
Unit	Available Lectures	Duration
I Phylum-chordata	12 periods	Sept. 22
II Class Amphibia	18 Periods	Sept. 22
III Class – Aves	12 Periods	Oct. 22
IV Evolution: Meaning and scope	14 periods	Oct. 22
V Evolutionary Process	14 periods	Nov. 22
VI Adaptive Radiation	13 period	Dec. 22
B.Sc. Part III SEM V		
Unit	Available Lectures	Duration
I Respiration and Circulation	15 periods	Sept. 22
II Muscle Physiology	20 periods	Sept. 22
III Nerve physiology and chemical Coordination	14 Periods	Oct. 22
IV Reproductive physiology, Homeostasis	12 periods	Oct. 22
V Agricultural Zoology: Economic Importance of Insect	09 periods	Nov. 22
VI- Aquaculture	13 periods	Dec. 22
B.Sc. Part I SEM II		
Unit	Available Lectures	Duration
I Cell structure and cell organelles	10 periods	
II Cell Organelles	14 periods	
III Nucleus and chromosome	15 period	
IV Cell division, Gametogenesis and Fertilization	14 period	
V Cleavage, Blastulation and Gastrulation in Amphioxus, Frog and chick	21 periods	
VI Placentation, Parthenogenesis, Regeneration and stem cell	16 periods	
B.Sc. Part II SEM IV		
Unit	Available Lectures	Duration

I Concept of genes	14 periods	
II Linkage	15 periods	
III Sex Determination	14 Periods	
IV Genetic Screening and Prenatal Diagnosis	15 periods	
V Ecology: Concept and scope	17 periods	
VI Ecosystem	15 periods	
B,Sc Part III SEM VI		
Unit	Available Lectures	Duration
I Genetic material (DNA and RNA)	12 periods	
II DNA replication	15 periods	
III The Genetic code, protein synthesis and Gene regulation	15 periods	
IV Mutation	15 periods	
V Biotechnology : Genetic Engineering	19 periods	
VI Immunology	14 Periods	

Perspective Plan for Co-curricular Activities 2022-23

Sr. No.	Activity	Tentative Duration
1.	Induction program of B.Sc I	September 2022
2.	Ozone Day celebration	September 2022
3.	Wild Life Week Celebration	October 2022
4	Fishery Day	November 2022
5.	International Day For elimination of violence against women	November 2022
6.	AIDS day celebration	December 2022
7.	Zoological Study circle formation	December 2022
8.	Any one Extension Activity	January 2023
09.	Celebration of death anniversary of scientist Carl Linnaeus	January 2023
10.	Earnest Hackel Birth Anniversary	February 2023
11.	National Science Day celebration	February 2023
12	International Women's Day	March 2023
13	World Sparrow day	March 2023

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Department of Zoology

DEPARTMENTAL CALENDAR 2022-23		
Day	**Event**	**Organizing Department**
August 2022		
01/08/2022 to 06/08/2022	Induction Programme of B.Sc I	Department of Zoology (online)
September 2022		
27/09/2023	Zoological study circle formation	Department of zoology
29/09/2022	Extension activity (Lumpy disease in cow)	Department of zoology
October 2022		
1st Oct ----8 Oct (wild life week)	Wild life week celebration	Dept. of Zoology
February 2023		
28 th February 2022	National Science Day celebration	Dept of Zoo, Bot and chemistry
March 2022		
14/03/2022	Out rich activity (To Aware women in rural area for their Hb and sickle cell anemia)	Department of zoology
20 March 2022	Word Sparrow Day	Dept. of zoology
April 2023		
05/04/23	Microtechnique workshop at shri Shivaji science college, Akot	Department of zoology Akot, Warwat , Anjangaon Surji and Telhara

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Teaching Periods Available per month during the session 2022-23

Faculty : Science (Dr. M. R. Solanke) **Subject : Zoology**

Teaching Plan for Theory (First Semester)		**Class : B .Sc. Part I**	
Sr. No.	**Life and diversity of non-chordate (chapter -Phylum -Porifera mand Phylum-Coelenterata)**	**Lectures Available**	**Lectures Utilized**
1	Phylum Porifera: General Characters	15	
2	Type study: Scypha: a) Habit, Habitat, External Features b) Cell types and Spicules c) Structure and significances of canal system	08	
3	Phylum Coelenterata: General Characters	01	
4	Type study: Metridium: a) Habits and habitat, External features b) Gastro-vascular cavity c) Mesenteries d) Reproduction	06	

Teaching Plan for Practical (First Semester)		**Class : B.Sc Part I**	
Sr. No.	**Life and diversity of Non-Chordata**	**Lectures Available (90)**	**Lectures Utilized**

	Observation, classification up to classes and sketching of following animals		
01	Phylum Protozoa	07	
02	Phylum Porifera	07	
03	Phylum Coelenterate	06	
04	Phylum Helminth	06	
05	Phylum Annelida	06	
06	Phylum Arthropoda	10	
07	Phylum Mollusca	06	
10	Phylum Echinodermata	06	
11	Phylum Hemichordata	06	
12	Permanent slide study	10	
13	Anatomical study through computer aided techniques, video clippings, photographs and other available resources	10	
14	Mountings	10	

Teaching Plan for Theory (Second Semester) **Class : B Sc.Part I**

Sr. No.	Life and diversity of chordata and concept of evolution	Lectures Available	Lectures Utilized
	(unit-II class-Amphibia and Reptilia)	**16**	
01	Habits and Habitat	01	
02	External characters	01	
03	Respiratory organs	02	
04	Circulatory system	02	

05	urinogenital system,	02	
06	parental care in amphibia	02	
07	Reptiles	01	
08	Circulatory system	02	
09	Urinogenital system	02	
10	Snake venom and antivenom	01	

Teaching Plan for practical (Second Semester)		**Class : B Sc .I**	
Sr. No.	**Life and diversity of chordata and concept of evolution**	**Lectures Available (96)**	**Lectures Utilized**
A	**Taxonomy of Chordata**		
1	General characters and classification of phylum chordata	03	
2	General characters and classification up to order of the following chordate as per availability in the laboratory from the major orders	03	
A	Protochordata		
B	Agnatha	03	
C	Pisces	06	
D	Amphibia	06	
E	Reptilia	06	
F	Aves	06	
G	Mammalia	06	
B	**Dissection**		

1	Dissection-afferent and efferent branchial vessels, cranial nerves, internal ear of scoliodon	06	
2	Dissection- Digestive system, Arterial system, venous system, reproductive system of rat	06	
3	Permanent micro-preparation- a. Fish scales b. Ampullae of Lorenzini. C. Eyeball muscles	06	
4	Observation of air bladder in air breathing fish	03	
C	**Osteology**		
1	Rabbit, Varanus (excluding loose bones of skull)	06	
E	**Evolution**		
1	Study of fossils, including living fossils	03	
2	Study of evidences of evolution. I) Analogues and homologues organs	03	
3	Study of Mesozoic Reptiles (By models/Charts)	03	
4	Mimicry- coloration in animals	03	
5	Beak and leg modification with reference to parrot, woodpeacker, kingfisher, heron, duck, sparrow or pigeon, hawk or kite, owl.	06	
F	**Histological slides**		
I	amphioxus- T.S. Oral Hood, pharynx and tail.	03	
II	Frog- T.S. Lung, Stomach, Kidney, intestine	03	

III	Rat: T.S. liver, pancreas, ovary, testis, pituitary, thyroid, Adrenal	06	
Teaching Plan for Theory (Third Semester)		**Class : B Sc. Part II**	
Sr. No.	**Life and diversity of Chordata and concept of evolution**	**Lectures Available (29)**	**Lectures Utilized**
	(unit-II class-Amphibia and Reptilia)	**17**	
01	Habits and Habitat	01	
02	External characters	01	
03	Respiratory organs	02	
04	Circulatory system	03	
05	urinogenital system,	02	
06	parental care in amphibia	02	
07	Reptiles	01	
08	Circulatory system	02	
09	Urinogenital system	02	
10	Snake venom and antivenom	01	
	Unit -III class Aves and Mammals	**(12)**	
	Class-Aves		
01	General characters	01	
02	External characters	01	
03	Respiratory system	02	
04	Urino-genital system	02	
05	Flight adaptation	02	
06	Migration in Birds	02	

	Class: Mammalia		
I	Morphology of mammalian endocrine glands	01	
II	Aquatic mammals	01	
	Life and diversity of chordata and concept of evolution	**Lectures Available (93)**	**Lectures Utilized**
A	Taxonomy of Chordata		
B	General characters and classification of phylum chordata	03	
C	General characters and classification up to order of the following chordate as per availability in the laboratory from the major orders		
	Protochordata	03	
	Agnatha	03	
	Pisces	03	
	Amphibia	03	
	Reptilia	03	
	Aves	03	
	Mammalia	03	
D	Anatomical study through computer aided techniques, video clippings, Models, photographs and other available resources		
E	Frog- viscera, digestive system, male and female reproductive system	06	

F	Rat or mouse or Rabbit – digestive system, arterial system, venous system and reproductive systems	06	
G	Slides of hair impression of different locally available mammals	06	
H	Osteology- Fowl and Rabbit excluding loose bones of skull	06	
I	Evolution		
J	Study of fossils and living fossils	03	
K	Study of evidences of evolution		
L	analogous and homologous organ	03	
M	Connecting links – peripatus, Archeopteryx, Echidna, Duckbill, Platypus	03	
N	Mimicry- coloration in animals through available examples in laboratory	03	
O	Beak and leg modification with reference to parrot, woodpecker, kingfisher, heron, duck, sparrow or pigeon, hawk or kite, owl.	03	
P	Histological slides		
I	amphioxus- T.S. Oral Hood, pharynx and tail.	06	
II	Frog- T.S. Lung, Stomach, Kidney, intestine	06	

Teaching Plan for Theory (Fourth Semester)		**Class : B Sc. Part II**	
Sr. No.	**Advanced Genetics and Animal Ecology** **UNIT 3 : Sex determination**	Lectures Available Total(28) (14)	Lectures Utilized

01	Discovery of sex chromosome	01	
02	Sex determination in animal	03	
03	Genetic disorder	03	
04	Non-disjunction	02	
05	Biochemical genetics	03	
06	Inheritance of sex-linked genes in man	02	
	Unit- V Ecology	14	
01	concept and scope		
02	Abiotic factors	07	
	a)Water B) Temperature c) Homeotherms and poikilotherms d)Dormancy e) Dormancy in different Group of animals h) Hibernation g) Aestivation h) Diapauses i) Light		
03	Biotic factors	07	
	a)Interspecific and intraspecific association b)Commensalism		

	c) Mutualism d) Predation e) Parasitim f) Antagonism		

	Teaching Plan for Practical (Forth Semester)	**Class: B.Sc. Part III**	
Sr. No.	**Advanced genetics and animal Ecology**	**Available lecture (87)**	**Lectures Utilized**
A	Genetic Experiment		
1	Recording of mendelian traits in man	03	
2	Detection of monohybrid and dihybrid cross with the help of plastic beads	03	
3	Culturing drosophila using standard methods – drosophila male and female identification, mutant forms (from pictures)	06	
4	Demonstration of bar bodies	03	
5	Preparation of human karyotypes from Xerox pictures	03	
6	Photoslides for turner syndrome, klienfelters syndrome, downs syndrome	03	
7	Detection of syndrome from chromosome spread pictures	03	
8	Study of following human genetic traits and application of hardy Weinberg principle to them	03	
I	Baldness, length of index and ring finger, attached and free earolobes , rolling of tongue, PTC test and other notable traits	06	

B	Ecology		
1	a) Use of pH meter for estimation of pH in soil sample b) Use of pH meter for estimation of pH in water sample	07	
2	Study of Chemical parameters of water	03	
A	Estimation of dissolved oxygen	03	
B	Estimation of Salinity	03	
C	Estimation of Free CO2, Carbonate and bicarbonate	03	
D	Estimation of Calcium and hardness of water	03	
3	Adaptation of aquatic and terrestrial animals based on study of museum specimen	03	
4	Study of natural ecosystem and field report of the visit	03	
5	Field collection methods	03	
6	Identification of common animals – soil invertebrate diversity, diversity of birds and mammals in parks/ botanical gardens, threats to local diversity	08	
7	Construction of food web diagram based on the field visit	03	
8	Mounting of plankton	03	
9	Qualitative analysis of fresh water plankton	03	
C	General		
1	Visit to a national park or sanctuaries and submission of report	06	

Teaching Plan for Theory (Fifth Semester)		Class : B. Sc. Part III	
Sr. No.	Animal Physiology And Economic Zoology	Lectures Available (15)	Lectures Utilized
	Unit-II Muscle Physiology:		
1	Types of Muscles: striated, non-striated and cardiac muscles	2	
2	Striated muscle: a) E.M. Structure b) Chemical Composition	4	
3	Neuromuscular junction.	2	
4	Mechanism of muscle contraction by Sliding filament theory	3	
5	a) Physical and Chemical changes during muscle contraction: i) muscle twitch, tetanus ii) isometric and isotonic contraction iii) summation of Stimuli, all or none law, iv) Fatigue.	3	
6	Rigor mortis.	1	

Teaching Plan for Practicals (Fifth Semester)		Class : B.Sc. Part III	
Sr. No.	Animal physiology and Economic zoology	Lectures Available (87)	Lectures Utilized
01	Detection of blood group in human being	06	

02	Differential count of blood	06	
03	Estimation of hemoglobin percentage with the help of haemometer.	06	
04	R. B. C. Count	06	
05	W. B. C. count	06	
06	Prepartion of haemin crystals	06	
07	Measurement of blood pressure	06	
08	Action of salivary amylase on starch	06	
09	Qualitative detection of nitrogenous waste products (Ammonia, urea, uric acid) in given sample.	06	
10	Demonstration of kymograph unit, Respirometer through available resources.	06	
11	Observation and identification of Insect Pests of local crops, and predator insects.	06	
12	Life cycle of honey bee, Lac Insect, silk moth	06	
13	Histological slides of major organs of respiratory system, circulatory system, Nervous system, Different type of muscles, endocrine gland, testis and ovary.	09	
14	Study of locally available fishes, Indian major carp, common carp and Exotic Carp	06	

Teaching Plan for Theory (Sixth Semester)		**Class : B. Sc. III**	
Sr. No.	**Biotechnology: Genetic Engineering** **Unit-VI: Immunology**	**Lectures Available(15)**	**Lectures Utilized**
01	Introduction to immune system	02	
02	Innate and adaptive immunity	02	
03	Types and production of immune cells	02	
04	Complement system	02	
05	Humoral immunity: Antigen and haptens	02	
06	Antibody: Types, function and production	03	
07	Immunological techniques	02	
Teaching Plan for Practicals (Sixth Semester)		**Class : B. Sc. III**	
Sr. No.	**Biotechnology: Genetic Engineering**	**Lectures Available (87)**	**Lectures Utilized**
01	Micro technique scope and importance	03	
02	Preparation of fixative- alcohol, acetone, formalin, Bouin's fluid, Cornoy fluid, Formal sublimate	06	
03	Collection of various tissues/ organs from slaughter house for micro-technique	03	
04	Preparation of Alcohol grades, dehydration and clearing of tissues	04	

05	Use and care of Oven	03	
06	Embedding and block making, trimming of block.	12	
07	Use and care of different types of Microtome	03	
08	Honing and stropping Knives	04	
09	Section cutting and spreading	04	
10	Preparation of various stains-Borax carmine Acetocarmine, Aceto-orcein, Hematoxylin, eosin	04	
11	Staining of the sections, (Double staining), Mounting	10	
12	Camera Lucida. Use and Drawings	09	
	Oculomicrometer scale/ similar micro-measurements use	06	
	Introduction to models of PCR, Southern blotting through available resources	06	
13	Vital Staining of mitochondria by using Janus, Green B stain	06	
	Extraction of DNA by using salt, detergent and enzymes from natural sources from any animal tissue / plant material	10	

Faculty : Dr. Madhuri S. Hingankar

Teaching Plan for Theory (First Semester):		Class: B. Sc. Part I	
Sr. No.	Topics to be covered	Lectures Available	Lectures Utilized

	Life And Diversity of Nonchordates	**16**	
	Unit IV Phylum Annelida & Arthropoda		
1	Phylum Annelida: General Characters.	1	
2	Type study: Leech: a) External features b) Digestive system c) Reproductive system	4	
3	Phylum Arthropoda: General Characters.	1	
4	Type study: Cockroach: a) Habits and habitat b) Digestive system, c) Excretory system d) Respiratory system, e) Reproductive system.	5	
5	Unit Test	1	
6	Module:	4	

Teaching Plan for Practical (First Semester): Class: B. Sc Part I

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	Life And Diversity of Nonchordates	**90**	
1	**Observation, classification up to classes and sketching of following animals**		
	Phylum Protozoa	6	
	Phylum Porifera	6	
	Phylum Coelenterata	6	
	Phylum Helminthes	3	
	Phylum Annelida	6	
	Phylum Arthropoda	9	
	Phylum Mollusca	9	
	Phylum Echinodermata	6	
	Phylum Hemichordata	3	
2	Permanent slide study	12	
3	Anatomical study through computer aided techniques, video clippings, photographs and other available resources	12	
4	Mountings	12	

Teaching Plan for Theory (Second Semester): Class: B. Sc. Part I

Sr. No.	Topics to be covered	Lectures Available	Lectures Utilized
	LIFE AND DIVERSITY OF CHORDATE AND CONCEPT OF EVOLUTION	**15**	
	Unit-I Phylum Chordata		
1	Origin of Chordata.	1	
2	Protochordates: Type study: Amphioxus: a) Habits and habitat, External Characters, b) Digestive system and feeding,	3	

	c) Excretory organs, gonads, d) Affinities of Amphioxus.		
3	Affinities of Agnatha	1	
4	Series Picses: Type study: Scoliodon sarrokawah (Dogfish) a) Habits and habitat, External Character b) Digestive system: alimentary canal and digestive glands, c) Respiratory system: respiratory organ and mechanism of respiration, d) circulatory System: Structure and working of Heart, e) Lateral line receptors,	5	
5	Migration in fishes-Types, causes and significance.	2	
6	Unit test	1	
7	Module	2	

Teaching Plan for practical (Second Semester):		Class: B Sc. Part I	
Sr. No.	**Topics to be covered**	**Lectures Available**	**Lectures Utilized**
	LIFE AND DIVERSITY OF CHORDATE AND CONCEPT OF EVOLUTION	96	
A	**Taxonomy of Chordate**		
1	General characters and classification of phylum chordate	3	
2	General characters and classification up to order of the following chordate as per availability in the laboratory from the major orders		
A	Protochordata	3	
B	Agnatha	3	
C	Pisces	6	
D	Amphibia	6	
E	Reptilia	6	
F	Aves	6	
G	Mammalia	3	
B	**Dissections:**		
	1. Dissection - afferent and efferent branchial vessels, cranial nerves, internal ear of scoliodon	6	
	2. Dissection - Digestive system, Arterial system, venous system, reproductive system of rat.	6	
	3. Permanent micro-preparations. a. Fish scales. b. Ampullae of Lorenzini. c. Eyeball muscles.	6	
	4. Observations of air bladder in air breathing fishes.	3	

C	**Osteology- Rabbit and Varanus excluding loose bones of skull**	**12**	
D	**Evolution**		
1	Study of fossils, including living fossils	3	
2	Study of evidences of evolution	3	
3	analogous and homologous organ	3	
4	Study of Mesozoic Reptiles (By models /charts)	3	
5	Mimicry- coloration in animals	3	
6	Beak and leg modification with reference to parrot, woodpecker, kingfisher, heron, duck, sparrow or pigeon, hawk or kite, owl.	6	
E	**Histological slides: - Amphioxus, Frog, Rat**		
	T.S, Oral hood, Pharynx, Tail T.S. lung, Stomach, Kidney, T.S. Intestine, T.S. Liver, Pancreas, Ovary, Testis, Pituitary, Thyroid, Adrenal	6	

Teaching Plan for Theory (Third Semester): **Class: B Sc. Part II**

Sr. No.	Topics to be covered	Lectures Available	Lectures Utilized
	LIFE AND DIVERSITY OF CHORDATE AND CONCEPT OF EVOLUTION	**30**	
	Unit-I Phylum Chordata		
1	Origin of Chordata.	2	
2	Protochordates: Type study: Amphioxus: a) Habits and habitat, External Characters, b) Digestive system and feeding, c) Excretory organs, gonads, d) Affinities of Amphioxus.	4	
3	Affinities of Agnatha	1	
4	Series Picses: Type study: Scoliodon sarrokawah (Dogfish) b) Habits and habitat, External Characters, b) Digestive system: alimentary canal and digestive glands, c) Respiratory system: respiratory organ and mechanism of respiration, d) circulatory System: Structure and working of Heart, major arteries and veins, e) Lateral line receptors,	6	
5	Migration in fishes-Types, causes and significance.	2	
	Unit- VI Concept of Evolution	1	
1	Adaptive radiations in mammals.	3	
2	Evolution of Man- brief accounts of i) Parapithecus, ii) Dryopithecus,	4	

	iii) Ramapithecus, iv) Australopithecus, v) Homo-erectus vi) Neanderthal man, vii) Cro-Magnon man and viii) modern man.		
3	i) Evolution of heart, ii) aortic arches, and iii) urinogenital systems of vertebrates	4	
4	Animal Adaptation: Desert, Aquatic and Terrestrial.	3	

Teaching Plan for Practical (Third Semester): **Class: B Sc. Part II**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	LIFE AND DIVERSITY OF CHORDATE AND CONCEPT OF EVOLUTION	93	
A	**Taxonomy of Chordate**		
1	General characters and classification of phylum chordate	3	
2	General characters and classification up to order of the following chordate as per availability in the laboratory from the major orders		
A	Protochordata		
B	Agnatha	3	
C	Pisces	6	
D	Amphibia	6	
E	Reptilia	6	
f	Aves	6	
g	Mammalia	6	
B	Anatomical study through computer aided techniques, video clippings, Models, photographs and other available resources		
1	Frog- viscera, digestive system, male and female reproductive system	3	
2	Rat or mouse or Rabbit – digestive system, arterial system, venous system and reproductive systems	6	
C	Slides of hair impression of different locally available mammals	3	
D	Osteology- Fowl and Rabbit excluding loose bones of skull	6	
E	Evolution		
1	Study of fossils and living fossils	3	
2	Study of evidences of evolution		
I	analogous and homologous organ	3	

II	Connecting links – Peripatus, Archaeopteryx, Echidna, Duckbill, Platypus	3	
3	Mimicry- coloration in animals through available examples in laboratory	3	
4	Beak and leg modification with reference to parrot, woodpecker, kingfisher, heron, duck, sparrow or pigeon, hawk or kite, owl.	3	
F	Histological slides		
I	Amphioxus- T.S. Oral Hood, pharynx and tail.	3	
II	Frog- T.S. Lung, Stomach, Kidney, intestine	3	

Teaching Plan for Theory (Fourth Semester): Class: B Sc. Part II

Sr. No.	Topics to be covered	Lectures Available	Lectures Utilized
	ADVANCED GENETICS AND ANIMAL ECOLOGY	32	
	Unit- I		
1	Concept of genes:	1	
2	Mendel's laws of hereditary	2	
3	Monohybrid Cross: Laws of dominance, Law of segregation.	3	
4	Dihybrid cross: Law of independent assortment.	3	
5	Interactions of genes: Supplementary factor, complementary factor,	3	
6	duplicates factor, inhibitory factors, and lethal factors dominant and recessive.	4	
	Unit- VI		
1	Ecosystem: a) Relationship between habitat and ecological niche b) Autotrophic and heterotrophic: producer, consumer and trophic levels c) Energy flow in an ecosystem d) food chain & food web e) pyramids f) Ecotypes.	4	
2	Homeostasis of ecosystem.	3	
3	Terrestrial ecosystem: Classification and Biomes.	2	
4	Aquatic ecosystem: a) Fresh water ecosystem i) Lentic ii) Lotic ecosystem,	2	
5	Marine ecosystem: a) Characteristics, salinity, temperature and pressure,	2	

	b) zonation and stratification		
6	Estuarine ecology: Characteristics, types, fauna and their adaptations.	3	
Teaching Plan for Practical (Fourth Semester):		**Class: B. Sc Part II**	
Sr. No.	**Topics to be covered**	**Lectures available**	**Lectures Utilized**
	ADVANCED GENETICS AND ANIMAL ECOLOGY	**87**	
A	Genetic Experiment		
1	Recording of Mendelian traits in man	3	
2	Detection of monohybrid and dihybrid cross with the help of plastic beads	6	
3	Culturing drosophila using standard methods – drosophila male and female identification, mutant forms (from pictures)	6	
4	Demonstration of bar bodies	3	
5	Preparation of human karyotypes from Xerox pictures	3	
6	Photo slides for turner's syndrome, klienfelter's syndrome, downs syndrome	6	
7	Detection of syndrome from chromosome spread pictures	6	
8	Study of following human genetic traits and application of hardy Weinberg principle to them		
I	Baldness, length of index and ring finger, attached and free earlobes, rolling of tongue, PTC test and other notable traits	6	
B	Ecology		
1	a) Use of pH meter for estimation of pH in soil sample b) Use of pH meter for estimation of pH in water sample	6	
2	Study of Chemical parameters of water	3	
A	Estimation of dissolved oxygen	3	
B	Estimation of Salinity	3	
C	Estimation of Free CO2, Carbonate and bicarbonate	3	
D	Estimation of Calcium and hardness of water	3	
3	Adaptation of aquatic and terrestrial animals based on study of museum specimen	3	
4	Study of natural ecosystem and field report of the visit	3	
5	Field collection methods	3	
6	Identification of common animals – soil invertebrate diversity, diversity of birds and	6	

	mammals in parks/ botanical gardens, threats to local diversity		
7	Construction of food web diagram based on the field visit	3	
8	Mounting of plankton	3	
9	Qualitative analysis of fresh water plankton	3	
C	General		
1	Visit to a national park or sanctuaries and submission of report	3	

Teaching Plan for Theory (Fifth Semester):		Class: B. Sc. Part III	
Sr. No.	**Topics to be covered**	**Lectures Available**	**Lectures Utilized**
	ANIMAL PHYSIOLOGY AND ECONOMIC ZOOLOGY	**29**	
	Unit IV Reproductive Physiology:	1	
	Estrous and menstrual cycle	3	
	hormonal control of reproduction in males	1	
	hormonal control of reproduction in females	1	
	Structure of mammalian Placenta.	2	
	Physiology of mammalian Placenta.	2	
	Homeostasis and conservative regulation:	1	
	Osmoregulation and ionic regulation in aquatic animals.	2	
	Osmoregulation in terrestrial animals Ammonotelism, ureotelism & uricotelism.	2	
	Thermoregulation in Poikilotherms and Homeotherms.	2	
	UNIT-V Agricultural Zoology:	1	
1	Economic importance of Insects	1	
2	Beneficial insects: Spider, Mantis, Ladybugs, Damsel bug, Mealybug destroyer, Soldier beetle, Green lacewing, Syrphid fly, Tachinid fly, Ichneumon wasp and Trichogramma wasp.	2	
3	Harmful Insects Stirred food grain pests, their injuries and control	2	
4	Pests of, Cotton, Sugarcane and Jowar. Damage and Control	2	
5	Economic importance of Rodents, Snakes, Owls and Bats.	2	
6	Apiculture	1	
7	Sericulture	1	

Teaching Plan for Practical (Fifth Semester)		Class: B.Sc. Part III	
Sr. No.	**Topics to be covered**	**Lectures Available**	**Lectures Utilized**
	Animal physiology and Economic zoology	87	

1	Detection of blood group in human being	6	
2	Differential count of blood	6	
3	Estimation of hemoglobin percentage with the help of haemometer.	6	
4	R. B. C. Count	6	
5	W. B. C. count	6	
6	Preparation of haemin crystals	6	
7	Measurement of blood pressure	6	
8	Action of salivary amylase on starch	6	
9	Qualitative detection of nitrogenous waste products (Ammonia, urea, uric acid) in given sample.	6	
10	Demonstration of kymograph unit, Respirometer through available resources.	6	
11	Observation and identification of Insect Pests of local crops, and predator insects.	6	
12	Life cycle of honey bee, Lac Insect, silk moth	6	
13	Histological slides of major organs of respiratory system, circulatory system, Nervous system, Different type of muscles, endocrine gland, testis and ovary.	9	
14	Study of locally available fishes, Indian major carp, common carp and Exotic Carp	6	

Teaching Plan for Theory (Sixth Semester): Class: B. Sc. III

Sr. No.	Topics to be covered	Lectures Available	Lectures Utilized
	MOLECULAR BIOLOGY & BIOTECHNOLOGY	**29**	
	Unit I		
1	Concept of Genetic material- a) Definition b) Experiments to prove DNA as genetic material: i) Griffith's transformation experiments with bacteriophage infections. ii) Avery and co-workers Experiments. iii) Hershey and Chase experiment.	3	
2	Chemistry and types DNA (A, B, Z)	2	
3	Mitochondrial DNA	2	
4	Chemistry types and function of RNA: mRNA, tRNA and rRNA and Non Genetic RNA.	3	
	Unit V		
1	Biotechnology: Genetic Engineering	1	

2	Recombinant DNA technology and gene cloning-enzymes in Recombinant DNA technology,	3	
3	Splicing and cloning of genes,	3	
4	vectors (plasmid and phage vectors),	2	
5	Gene transfer.	2	
6	Somatic cell hybridization,	2	
7	Hybridoma technology,	2	
8	Monoclonal antibodies.	2	
9	Practical applications and suspected hazards of biotechnology and genetic engineering in animals.	2	

Teaching Plan for Practical (Sixth Semester)		Class : B. Sc. Part III	
Sr. No.	**Topic to be covered**	**Lectures Available**	**Lectures Utilized**
	MOLECULAR BIOLOGY & BIOTECHNOLOGY	**87**	
1	Micro technique scope and importance	3	
2	Preparation of fixative- alcohol, acetone, formalin, Bouin's fluid, Cornoy fluid, Formal sublimate	6	
3	Collection of various tissues/ organs from slaughter house for micro-technique	3	
4	Preparation of Alcohol grades, dehydration and clearing of tissues	6	
5	Use and care of Oven	3	
6	Embedding and block making, trimming of block.	12	
7	Use and care of different types of Microtomes	3	
8	Honing and stropping Knives	3	
9	Section cutting and spreading	3	
10	Preparation of various stains-Borax carmine Acetocarmine, Aceto-orcein, Haematoxyline, eosin	6	
11	Staining of the sections, (Double staining), Mounting	12	
12	Camera Lucida. Use and Drawings	9	
13	Oculomicrometer scale/ similar micro-measurements use	6	
14	Introduction to models of PCR, Southern blotting through available resources	6	
15	Vital Staining of mitochondria by using Janus, Green B stain	6	

16	Extraction of DNA by using salt, detergent and enzymes from natural sources from any animal tissue / plant material	6	

Faculty: Miss Sonali Tayade 2022-23

Teaching Plan for Theory (First Semester)		**Class : B Sc Part I**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	UNIT 1 : Classification of Non Chordata and Phylum Protozoa	**15**	
01	Classification of Non-Chordata	02	
02	Phylum Protozoa : General characters	02	
03	Type Study : Plasmodium vivax : Structure, Life Cycle	07	
04	Parasitic protozoan and human diseases: Malaria, Amoebiasis	04	
	UNIT 5	**15**	
05	Phylum Mollusca: General characters	O2	
06	Type Study: *Pila globusa*	06	
07	Phylum Echinodermata: General characters	01	
08	Type Study: *Asterias*	06	

Teaching Plan for Practical (First Semester)		**Class : B Sc Part I**	
Sr. No.	Topic to be covered	Lectures Available **(90)**	Lectures Utilized
1	Observation, classification up to classes and sketching of following animals		
	Phylum Protozoa	06	

	Phylum Porifera	03	
	Phylum Colenterata	06	
	Phylum Helminths	03	
	Phylum Annelida	06	
	Phylum Arthopoda	09	
	Phylum Mollusca	09	
	Phyum Echinodermata	06	
	Phylum Hemichordata	03	
2	Permanent slide study	12	
3	Anatomical study through computer aided techniques, video clippings, photographs and other available resources	15	
4	Mountings	12	

Teaching Plan for Theory (Second Semester) **Class : B Sc Part I**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	UNIT 4	**15**	
01	Evolution meaning and scope	02	
02	Indirect evidences of evolution	05	
02	Direct evidences of evolution	08	
	UNIT 5	**15**	
01	Evolutionary processes	04	
02	Speciation	03	

03	Modern concept of organic evolution	02	
04	Population genetics	06	

Teaching Plan for Practical (Second Semester)		Class : B Sc Part I	
Sr. No.	**Topic to be covered**	**Lectures Available (96)**	**Lectures Utilized**
A	**Taxonomy of Chordata**		
1	General characters and classification of phylum chordata	03	
2	General characters and classification up to order of the following chordate as per availability in the laboratory from the major orders	03	
A	Protochordata		
B	Agnatha	03	
C	Pisces	06	
D	Amphibia	06	
E	Reptilia	06	
F	Aves	06	
G	Mammalia	06	
B	**Dissection**		
1	Dissection-afferent and efferent branchial vessels, cranial nerves, internal ear of scoliodon	06	
2	Dissection- Digestive system, Arterial system, venous system, reproductive system of rat	06	

3	Permanent micro-preparation- a. Fish scales b. Ampullae of Lorenzini. C. Eyeball muscles	06	
4	Observation of air bladder in air breathing fish	03	
C	**Osteology**		
1	Rabbit, Varanus (excluding loose bones of skull)	06	
E	**Evolution**		
1	Study of fossils, including living fossils	03	
2	Study of evidences of evolution. I) Analogues and homologues organs	03	
3	Study of Mesozoic Reptiles (By models/Charts)	03	
4	Mimicry- coloration in animals	03	
5	Beak and leg modification with reference to parrot, woodpeacker, kingfisher, heron, duck, sparrow or pigeon, hawk or kite, owl.	06	
F	**Histological slides**		
I	amphioxus- T.S. Oral Hood, pharynx and tail.	03	
II	Frog- T.S. Lung, Stomach, Kidney, intestine	03	
III	Rat: T.S. liver, pancreas, ovary, testis, pituitary, thyroid, Adrenal	06	
Teaching Plan for Theory (Third Semester)		**Class : B Sc Part II**	

	Topic to be covered	Lectures Available	
	UNIT 4	**15**	
1	Evolution meaning and scope	02	
2	Indirect evidences of evolution	05	
3	Direct evidences of evolution	08	
	UNIT 5	**16**	
1	Evolutionary processes	04	
2	Speciation	03	
3	Modern concept of organic evolution	02	
4	Population genetics	07	
	Teaching Plan for Practical (Third Semester) Class : B Sc Part II		
	Topic to be covered	**Lectures Available (93)**	**Lectures Utilized**
A	**Taxonomy of Chordata**		
1	General characters and classification of phylum chordata	03	
2	General characters and classification up to order of the following chordate as per availability in the laboratory from the major orders	06	
I	Protochordata		
II	Agnatha	03	

III	Pisces	06	
IV	Amphibia	06	
V	Reptilia	06	
VI	Aves	06	
VII	Mammalia	06	
B	**Anatomical study through computer aided techniques, video clippings, Models, photographs and other available resources**		
1	Frog- viscera, digestive system, male and female reproductive system	06	
2	Rat or mouse or Rabbit – digestive system, arterial system, venous system and reproductive systems	06	
C	**Slides of hair impression of different locally available mammals**	03	
D	**Osteology- Fowl and Rabbit excluding loose bones of skull**	06	
E	**Evolution**		
1	Study of fossils and living fossils	03	
2	Study of evidences of evolution		
I	analogous and homologous organ	03	
II	Connecting links – peripatus, Archeopteryx, Echidna, Duckbill, Platypus	03	
III	Mimicry- coloration in animals through available examples in laboratory	03	
IV	Beak and leg modification with reference to parrot, woodpeacker,	06	

	kingfisher, heron, duck, sparrow or pigeon, hawk or kite, owl.		
F	**Histological slides**		
I	amphioxus- T.S. Oral Hood, pharynx and tail.	06	
II	Frog- T.S. Lung, Stomach, Kidney, intestine	06	

Teaching Plan for Theory (Fourth Semester)		**Class : B Sc Part II**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	UNIT 2 : Linkage	*15*	
01	Linkage : Types of linkage, linkage group, arrangement of linked genes and significance of linkage	*04*	
02	Crossing Over- Types	*03*	
03	Mechanism of Crossing over	*01*	
04	Theories of crossing over	*02*	
05	Factors influencing the crossing over and significance of crossing over	*02*	
06	Multiple alleles in relation to eye colour in Drosophila, blood group in man, Erythroblastosis foetalis	*03*	
	UNIT 4 : Genetic screening and parental diagnosis	**15**	
01	Prenatal test, carrier, Chronic villus sampling, Amniocentesis	03	
02	Gene probe and DNA Analysis	04	

02	Genes and human heredity: Inheritance of eye colour, inheritance of skin colour, Recessive genes and consanguineous marriages	03	
03	Genetic counseling: Risk of marriages in affected family, Birth control measures (Male and Female)	03	
04	Kinds of twines	02	

Teaching Plan for Practical (Fourth Semester)		**Class : B Sc Part II**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	Advanced Genetics and Animal Ecology	**87**	
A	**Genetic Experiment**		
1	Recording of mendelian traits in man	03	
2	Detection of monohybrid and dihybrid cross with the help of plastic beads	06	
3	Culturing drosophila using standard methods – drosophila male and female identification, mutant forms (from pictures)	06	
4	Demonstration of bar bodies	06	
5	Preparation of human karyotypes from Xerox pictures	03	
6	Photoslides for turner syndrome, klienfelters syndrome, downs syndrome	06	
7	Detection of syndrome from chromosome spread pictures	03	
8	Study of following human genetic traits and application of hardy	06	

	Weinberg principle to them- Baldness, length of index and ring finger, attached and free earlobes, rolling of tongue, PTC test and other notable traits		
B	**Ecology**		
1	a) Use of ph meter for estimation of ph in soil sample b) Use of ph meter for estimation of ph in water sample	06	
2	Study of Chemical parameters of water		
A	Estimation of dissolved oxygen	03	
B	Estimation of Salinity	03	
C	Estimation of Free CO2, Carbonate and bicarbonate	03	
D	Estimation of Calcium and hardness of water	03	
3	Adaptation of aquatic and terrestrial animals based on study of museum specimen	03	
4	Study of natural ecosystem and field report of the visit	03	
5	Field collection methods	03	
6	Identification of common animals – soil invertebrate diversity, diversity of birds and mammals in parks/ botanical gardens, threats to local diversity	06	
7	Construction of food web diagram based on the field visit	03	
8	Mounting of plankton	03	

9	Qualitative analysis of fresh water plankton	06	
C	**General**		
1	Visit to a national park or sanctuaries and submission of report	03	

Teaching Plan for Theory (Fifth Semester) **Class : B Sc Part III**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	UNIT 1: Respiration and Circulation	**15**	
01	Structure of respiratory organs	02	
02	Mechanism of respiration	02	
03	Respiratory pigment	01	
04	Transport of gases	O2	
05	Neurophysiological control of respiration	02	
06	Blood	02	
07	Coagulation of blood	01	
08	Blood group: ABO system and Rh-factor	01	
09	Heart	02	

Teaching Plan for Practical (Fifth Semester) **Class : B Sc Part III**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	Animal physiology and Economic Zoology	**87**	
01	Detection of blood group in human being	06	

02	Differential count of blood	06	
03	Estimation of hemoglobin percentage with the help of haemometer.	06	
04	R. B. C. Count	06	
05	W. B. C. count	06	
06	Preparation of haemin crystals	06	
07	Measurement of blood pressure	06	
08	Action of salivary amylase on starch	06	
09	Qualitative detection of nitrogenous waste products (Ammonia urea, uric acid) in given sample.	06	
10	Demonstration of kymograph unit, Respirometer through available resources.	06	
11	Observation and identification of Insect Pests of local crops, and predator insects.	06	
12	Life cycle of honey bee, Lac Insect, silk moth	06	
13	Histological slides of major organs of respiratory system, circulatory system, Nervous system, Different type of muscles, endocrine gland, testis and ovary.	09	
14	Study of locally available fishes, Indian major carp, common carp and Exotic Carp	06	
Teaching Plan for Theory(Sixth Semester)		**Class : B Sc III**	

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	UNIT 2 : DNA Replication	**16**	
01	Types of replication	02	
02	Semi conservative method	03	
03	Experiment by Messelson and Stahl	01	
04	Concept of gene	01	
05	One gene one enzyme hypothesis	02	
06	One gene one Polypeptide theory	02	
07	A brief account of concept and action of cistron split genes, overlapping genes and jumping genes	03	
08	Genetic diseases : Spinocerebellar ataxia	02	

Teaching Plan for Practical (Sixth Semester) **Class : B Sc III**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
	Molecular Biology and Biotechnology	**87**	
01	Micro technique scope and importance	03	
02	Preparation of fixative- alcohol, acetone, formalin, Bouin's fluid, Cornoy fluid, Formal sublimate	06	
03	Collection of various tissues/ organs from slaughter house for micro-technique	03	
04	Preparation of Alcohol grades, dehydration and clearing of tissues	06	

05	Use and care of Oven	03	
06	Embedding and block making, trimming of block.	12	
07	Use and care of different types of Microtome	03	
08	Honing and stropping Knives	03	
09	Section cutting and spreading	03	
10	Preparation of various stains-Borax carmine Acetocarmine, Aceto-orcein, Haematoxyline, eosin	06	
11	Staining of the sections, (Double staining), Mounting	12	
12	Camera Lucida. Use and Drawings	06	
13	Oculomicrometer scale/ similar micro-measurements use	06	
14	Introduction to models of PCR, Southern blotting through available resources	03	
15	Vital Staining of mitochondria by using Janus, Green B stain	06	
16	Extraction of DNA by using salt, detergent and enzymes from natural sources from any animal tissue / plant material	06	

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SATPUDA EDUCATION SOCIETY, JALGAON (JAMOD)'S

ARTS & COMMERCE COLLEGE

WARVAT BAKAL DIST- BULDANA

DEPARTMENT OF COMMERCE

DEPRTMENTAL ACADEMIC CALENDAR 2022-23

Departmental Academic Calendar (2022-23)

Sr. No.	Activity	Commencement	Cessation	TotalDays
01	FirstSession	01/07/2022	30/11/2022	110
02	AdmissionProcess	01/07/2022	16/07/2022	14
03	TeachingDays(OddSemesters)	25/07/2022	22/10/2022	71
		09/11/2022	30/11/2022	19
				90
04	Induction Program for FirstYearStudents	18/07/2022	23/07/2022	06
05	FirstTermVacation	24/10/2022	08/11/2022	16
06	Odd Semesters UniversityExam	01/12/2022	21/01/2023	45
07	Academic Session (Second Session)	23/01/2023	13/05/2023	
08	Teaching Days (EvenSemesters)	01/02/2023	04/05/2023	93
09	SecondTermVacation	15/05/2023	01/07/2023	
10	Even Semesters UniversityExam	06/05/2023	01/07/2023	
11	CommencementofnextAcademicsession	03/07/2023		

Sr. No.	Public Holiday	Day & Date
01	Moharam	Tuesday, 9th August, 2022
02	Rakshabandhan	Thursday 11th August, 2022
03	Independence Day	Monday, 15th August, 2022
04	Parsi New Year	Tuesday, 16th August, 2022
05	Shri Ganesh Chaturthi	Wednesday, 31st August, 2022
06	Anant Chaturthi	Friday, 9th September, 2022
07	Dasara	Wednesday, 5th October, 2022
08	Republic Day	Thursday, 26th January, 2023
09	Mahashivratri	Saturday, 18th February, 2023
10	Holi (Second Day)	Tuesday, 7th March ,2023
11	GudhiPadwa	Wednesday, 22nd March, 2023
12	Shriram Navmi	Thursday, 30th March, 2023
13	Mahavir Jayanti	Tuesday, 4th , March, 2023
14	Good Friday	Friday, 7th April, 2023
15	Dr. Babasaheb Ambedkar Jayanti	Friday, 14TH April, 2023
16	Ramzan ID (Id-Ul-Fitar)	Saturday, 22nd April, 2023
17	Maharashtra Day	Monday, 1st April, 2023
18	Buddha Pournima	Friday, 5th May, 2023

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Time Table

Faculty : Commerce

Subject : BEC, ITA, STA,CMA,I&WWW, MEC

Dr.S.W.Rane.

Period	1	2	3	4	5	6
Day / Time	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	1:34 to 2:22	2:22 to 3:10	3:10 to 3:58
MON	II	III	I		III	
TUE	II	III	I		III	
WED	II	III	I		III	
THUS	III	I	II		III	
FRI	III	I	II		II	
Period	1	2	3	4	5	6
Day / Time	07:30 to 08:18	08:18 to 09:06	09:06 to 09:54	10:04 to 10:52	10:52 to 11:40	11:40 to 12:28
SAT		III	II			

Allotted Workload

Subject : COMMERCE

Year : 2022-23

Sr. No.	Class	No. of periods per week			Paper Allotted
		Lectures	Tutorials	Practical	
1	B.Com I	05	----	----	----
2	B.Com II	05+02	----	----	----
3	B.Com III	05+05	----	----	----
4	M.Com I	5	----	---	----

Total Workload per week (L+T+P) : 27 (L) + 00 (T) = 27 (21 hrs. 6 m)

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Teaching Periods Available per month during the session 2022-23

Faculty : COMMERCE **Subject : BEC, ITA, BMS,CMA,I&WWW**

		ODD SEMESTER						EVEN SEMESTER				
Class	Periods	July 22	Aug 22	Sept 22	Oct 22	Nov 22	Total	Feb 23	Mar 23	April 23	May 23	Total
B.Com I (PEC, BEC)	Theory	05	18	21	14	16	74	24	27	25	04	80
		--	--	--	--	--	00	--	--	--	--	
B.Com II (ITA, STA)	TH. (ITA)	05	18	21	14	16	74	24	27	25	04	80
	TH. (BMS)	02	08	08	07	06	31	08	09	09	00	26
B.Com III (CMA, I&WWW)	TH. (CMA)	05	18	21	14	16	74	24	27	25	04	80
	TH. (I&WWW)	05	18	21	15	16	75	24	27	25	04	80

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Teaching Plan for Theory (First Semester) Class : B com Part I (PEC)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	INTRODUCTION	13	
02	UTILITY APPROACH	13	
03	ELASTICITY OF DEMAND	12	
04	PRODUCTION FUNCTION	12	
05	COST AND REVENUE	12	
06	Skill Enhancement Module	12	
Teaching Plan for Tutorial (Second Semester) Class : B com Part I (BEC)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	BUSINESS AND MANEGERIAL ECONOMICS	13	
02	MARKET STRUCTURE	13	
03	MARKET STRUCTURE	13	
04	FACTORS PRICING	14	
05	FACTORS PRICING	14	
06	Skill Enhancement Module	13	
Teaching Plan for Theory (Third Semester) Class : B com Part II (AUD)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	MEANING OF AUDITING	15	
02	INTERNAL CHECK SYSTEM	15	
03	COMPANY AUDITOR	14	
04	AUDIT OF DIVISIBLE PROFIT	15	
05	AUDIT OF BANKING	15	
Teaching Plan for Theory (FourthSemester) Class : B COM II (IT)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	BASIC CONCEPT-INCOME TAX	16	
02	COMPUTATION OF INCOME FROM SALARY	16	
03	INCOME FROM OTHER SOURCES	16	
04	INCOME TAX AUTHORITIES	16	
05	RETURN OF INCOME	16	
Teaching Plan for Theory (ThirdSemester) Class : B com Part II (BMS)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	MATHEMATICS OF FINANCE	15	
02	RATIO AND PROPORTION	16	
Teaching Plan for Theory (FourthSemester) Class : B COM Part II (BST)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	CONCEPT OF DISPERSION	13	
02	CO-EFFICIENT OF DISPERSION	13	
Teaching Plan for Theory (FifthSemester) Class : B com Part III (CAC)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	COST ACCOUNTING	15	
02	MATERIAL COST	15	
03	LABOUR COST	14	
04	OVERHEADS	15	
05	PROCESS COSTING	15	
Teaching Plan for Theory (SixthSemester) Class : B com Part III (MAC)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	MANAGEMENT ACCOUNTING	16	
02	BREAK-EVEN-ANALYSIS	16	
03	RATIO ANALYSIS	16	

04	BUDGET	16	
05	BUDGETARY CONTROL	16	
Teaching Plan for Theory (Fifth Semester) Class : B COM Part III (I&WW-I)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	NETWORK	15	
02	INTERNET	15	
03	ELECTRONIC MAIL	15	
04	THE WORLD WIDE WEB (W3C)	15	
05	DESIGNING WEBSITE/WEBPAGE	15	
Teaching Plan for Theory (Sixth Semester) Class : B com Part III (I&WW-II)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	WEB BROWSING	16	
02	WEB DIRECTORY	16	
03	SOCIAL NETWORKING	16	
04	GOOGLE DRIVE	16	
05	M.S. FRONT PAGE EXPRESS	16	

Time Table

Faculty : Commerce

Subject : B.COM Part I PBM, PBO, CFS-I/II,
B.COM Part II COA, CAT,
B.Com Part III BRFC, CLAW, EOE-I/II

Dr.S.J.Tale

Period	1	2	3	4	5	6
Day / Time	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	1:34 to 2:22	2:22 to 3:10	3:10 to 3:58
MON		B.Com II	B.Com III	B.Com I	B.Com I	
TUE		B.Com I	B.Com III	B.Com III	B.Com II	
WED		B.Com II	B.Com III	B.Com III	B.Com I	
THUS		B.Com II	B.Com I	B.Com III	B.Com I	
FRI	B.Com I	B.Com II	B.Com III	B.Com III		
Period	1	2	3	4	5	6
Day / Time	07:30 to 08:18	08:18 to 09:06	09:06 to 09:54	10:04 to 10:52	10:52 to 11:40	11:40 to 12:28
SAT	B.Com III	B.Com I		B.Com III		

Allotted Workload

Subject : COMMERCE

Year : 2022-23

Sr. No.	Class	No. of periods per week			Paper Allotted
		Lectures	Tutorials	Practical	
1	B.Com I	08	----	----	
2	B.Com II	05	----	----	
3	B.Com III	10	----	----	

Total Workload per week (L+T+P) : 23 (L) + 00 (T) = 23 (18 hrs. 24 m)

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Teaching Periods Available per month during the session 2022-23

Faculty : COMMERCE **Subject : : B.COM Part I PBM, PBO, CFS-I/II,**

B.COM Part II COA, CAT, B.Com Part III BRFC, CLAW, EOE-I/II

		ODD SEMESTER						EVEN SEMESTER				
Class	Periods						Total					Total
B.Com I SEM I (PBO, CFS-I)	PBO (T)	04	17	20	13	15	69	23	26	24	03	75
	CFS-I (T/P)	04	17	20	13	15	69	23	26	24	03	75
B.Com II SEM III (COA)	COA (T)	05	18	21	14	16	74	24	27	25	04	80
B.Com III SEM V (BRFC/ EOE-I)	BRFC (T)	05	18	21	14	16	74	24	27	25	04	80
	EOE (T)	05	18	21	14	16	74	24	27	25	04	80

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Teaching Plan for Theory (First Semester) Class : B com Part I (PBO)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Commerce and Industry	15	
02	Business	14	
03	Merger and Acquisition	14	
04	New Enterprises	14	
05	Trade in India	12	
Teaching Plan for Tutorial (First Semester) Class : B com Part I (CFS-I)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Fundamentals of Computer	15	
02	Computer Organization	14	
03	Memory organization of Computer	14	
04	Input/Output Devices of Computer System	14	
05	Word Processing Working with Text IMS-WORD 2007]	12	
Teaching Plan for Theory (Second Semester) Class: B com Part I (PBM)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Management Concept	15	
02	Planning	15	
03	Organizing	15	
04	Directing	15	
05	Controlling	15	
Teaching Plan for Tutorial (Second Semester) Class : B com Part I (CFS-II)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Operating System	15	
02	Operating System [Advance]	15	
03	Modern communications [Concepts only]:	15	
04	Word Processing working with Table and t3raphics: IMS-WORD 20071	15	
05	PowerPoint Presentation	15	
Teaching Plan for Theory (Third Semester) Class : B com Part II (COA)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Issue, Forfeiture and Re-issue of Shares.	15	
02	Final Accounts of Company	15	
03	Profit Prior tolncorporations.	15	
04	Amalgamation of Company	15	
05	Absorption of Company	14	
Teaching Plan for Theory (FourthSemester) Class : B COM II (CAT)			
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Final Accounts of Banking Company	16	
02	Final Accounts of Fire and Accident Insurance Company	16	
03	Liquidation of Company	16	
04	Valuation of Goodwill	16	
05	Valuation of Shares	16	
Teaching Plan for Theory (FifthSemester) Class : B com Part III (BRFC)			

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Indian Contract Act1872	15	
02	Special Contacts	15	
03	Sales of Goods Act, 1930 and Consumer Protection Act, 1986	15	
04	Negotiable Instrument Aet, 1881	15	
05	Goods and Sewices Tax Act, 2017	14	
Teaching Plan for Theory (FifthSemester)	**Class : B COM Part III (EOE-I)**		
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Basics of E-Commerce	15	
02	E-Commerce in India	15	
03	Retail E-Commerce	15	
04	B28 E-Commerce	15	
05	E- Payment and E-Banking	14	
Teaching Plan for Theory (SixthSemester)	**Class : B com Part III (CLAW)**		
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Introduction; Definition, Silent Features of Company, Act 2013	16	
02	Incorporation of Company	16	
03	Share Capital of Company	16	
04	Securities Market	16	
05	Company Secretary and Company Meetings	16	
Teaching Plan for Theory (Sixth Semester)	**Class : B COM Part III (EOE-II)**		
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Internet E-Commerce Business Models	16	
02	B2C Internet Marketing	16	
03	B28 Online Marketing	16	
04	E-Governance	16	
05	E- Governance Models	16	

Time Table

Faculty : COMMERCE

Subject :FAC,IFS,ITB,BST,EOD

Mr. S.R.Bhaltadak

Period	1	2	3	4	5	6
Day / Time	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	1:34 to 2:22	2:22 to 3:10	3:10 to 3:58
MON	III (EOD)	I (FAC)		II (IFS)		II (ITB)
TUE	III (EOD)	II(IFS)	II (ITB)	I (FAC)		II (BST)
WED	III (EOD)	I (FAC)	II (BST)	II (ITB)		
THUS	II (ITB)	III (EOD)		II (IFS)	II (BST)	
FRI		III (EOD)	I (FAC)	II (IFS)		
Period	**1**	**2**	**3**	**4**	**5**	**6**
Day / Time	07:30 to 08:18	08:18 to 09:06	09:06 to 09:54	10:04 to 10:52	10:52 to 11:40	11:40 to 12:28
SAT	I (FAC)	II (IFS)		II (ITB)		

Allotted Workload

Subject: FAC,IFS,ITB,BST,EOD

Year : 2022-23

Sr. No.	Class	No. of periods per week			Paper Allotted
		Lectures	Tutorials	Practical	
1	B.COM.I (FAC)	05	----	----	
2	B.COM.II (IFS)	05	----	----	
3	B.COM. II (ITB)	05	----	----	
4	B.COM.II (BST)	03	---	----	
5	B.COM.III (EOD)	05	----	-----	

Total Workload per week (L+T+P) : 23 (L) + 00 (T)+00(P) = 23 (18.24 Hrs)

Arts & Commerce College Warvat Bakal

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Arts & Commerce College,
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Teaching Periods Available per month during the session 2022-23

Faculty : COMMERCE **Subject :FAC,IFS,ITB,BST,EOD**

		ODD SEMESTER						EVEN SEMESTER				
Class	Periods	July 22	Aug 22	Sep 22	Oct 22	Nov 22	Total	Feb 23	Mar 23	Apr 23	May 23	Total
B.Com I (FAC)	Th. (FAC)	05	18	22	14	16	75	24	27	25	09	85
B.Com II (IFS, ITB, BST)	TH. (IFS)	05	18	21	14	16	74	23	27	25	09	84
	TH. (ITB)	05	18	21	14	16	74	24	27	25	09	85
	TH. (BST)	03	10	12	08	09	42	12	14	14	05	45
B.Com III (EOD)	TH. (EOD)	05	18	21	14	16	74	24	27	25	08	84

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Teaching Plan for Theory (First Sem.) Class : B.Com. Part I Sub-Advanced Accountancy

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	BOOK KEEPING & ACCOUNTANCY	13	
02	ACCOUNTING TRANSACTION	13	
03	SUB-SIDIARY BOOKS	13	
04	RECTIFICATION OF ERROR	12	
05	DEPRICIATION ACCOUNTING	12	
06	SKILL ENHANNCEMENT MODULE	12	
	TOTAL	75	

Teaching Plan for Theory (Second Sem.)Class : B.Com. Part I Sub- Finanncial Accounting

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	FINAL ACCOUNTS OF INDIVIDUAL	15	
02	BILL OF EXCHANGE	15	
03	ACCOUNTS OF NON PROFIT ORGANIZATION	15	
04	FINAL ACCOUNTS OF CO-OPERATIVE SOCIETIES	13	
05	FINAL ACCOUNTS OF PARTENERSHIP FIRMS	13	
06	SKILL ENHANNCEMENT MODULE	13	
	TOTAL	84	

Teaching Plan for Theory (Third Sem.) Class :B.Com. Part II Sub- Monetary System

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	MONEY	14	
02	VALUE OF MONEY	15	
03	PRICE FLUCTUATIONS	15	
04	MONEY MARKET	15	
05	CAPITAL MARKET	15	
	TOTAL	74	

Teaching Plan for Theory (Fourth Sem.) Class : B.Com. Part II Sub- Indian Financial System

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	INDIAN FINANCIAL MARKET	18	
02	INDIAN BANKS	18	
03	COMMERCIAL BANKS	18	
04	RESERVE BANK OF INDIA	15	
05	STOCK EXCHANGE	15	
	TOTAL	84	

Teaching Plan for Theory (Third Sem.) Class : B.Com. Part II Sub- InformatiomTechnplogy& Business Data Processing-I

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	DATA & DATA PROCESSING	11	
02	DATABASE	10	
03	DATABASE MANAGEMENT SYSTEM	10	
04	SPREADSHEET PACKAGE	19	
05	FORMULAS,FUNCTIONS AND CHART IN EXCELS	24	
	TOTAL	74	

Teaching Plan for Theory (Fourth Sem.) Class : B.Com. Part II Sub- InformatiomTechnplogy& Business Data Processing-II

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	INFORMATION TECHNOLOGY	10	
02	COMPUTERISED ACCOUNTING PACKAGE	10	
03	ACCOUNTING SOFTWARE	10	
04	WORKING IN TALLY	10	
05	REPORTS & ADVANCED FEATURES IN TALLY	44	

	TOTAL	84	
Teaching Plan for Theory (Third Sem.)	**Class : B.Com. Part II**	**Sub- Business Mathematics**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	NATURAL NUMBERS,INTEGERS	10	
02	H.C.F. & L.C.M.	10	
03	PERCENTAGE-DISCOUNT ,COMMISSION& BROKERAGE	10	
04	AVERAGE, PROFIT & LOSS	12	
	TOTAL	42	
Teaching Plan for Theory (Fourth Sem.)	**Class : B.Com. Part II**	**Sub- Business Statistics**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	INTRODUCTION OF STATISTICS	15	
02	INDEX NUMBERS	15	
03	ANALYSYS OF UNIVERSAL DATA	15	
	TOTAL	45	
Teaching Plan for Theory (Fifth Sem.)	**Class : B.Com. Part III**	**Sub- Business Environment**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	INDIAN BUSINESS ENVIRONMENT	15	
02	INDIAN AGRICULTURAL ENVIRONMENT	15	
03	INDIAN INDUSTRIAL ENVIRONMENT	15	
04	INDIAN SERVICE ENVIRONMENT	15	
05	INDIA & FOREIGN TRADE ENVIRONMENT	14	
	TOTAL	74	
Teaching Plan for Theory (Sixth Sem.)	**Class : B.Com. Part III**	**Sub- Economics Of Development**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	ECONOMIC DEVELOPMENT	15	
02	ECONOMIC GROWTH MODELS	15	
03	ECONOMIC GROWTH MODELS	18	
04	GROWTH- BALANCED & UNBALANCED	18	
05	DEVELOPMENT OF CAPITAL- HUMAN & FINANCIAL	18	
	TOTAL	84	

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ARTS & COMMERCE COLLEGE, WARVAT BAKAL

Department : Commerce

PROGRAMS SCHEDULE (2022 - 23)

Sr. No.	Particulars	Date
1	Online Bridge Course For First Year Students	04/08/2022
2	Online Quiz Competition OnMahatama Gandhi Jayanti	02/10/2022
3	Study Circle Formation	12/11/2022
4	Debate	15/12/2022
5	Group Discussion	29/12/2022
6	World Consumer Day	15/03/2023
7	Seminar	18/03/2023
8	Guest Lecture	11/04/2023

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SATPUDA EDUCATION SOCIETY, JALGAON (JAMOD)'S

ARTS & COMMERCE COLLEGE

WARVAT BAKAL DIST- BULDANA

DEPARTMENT OF ECONOMICS

DEPRTMENTAL ACADEMIC CALENDAR 2022-23

Departmental Academic Calendar (2022-23)

Sr.No.	Activity	Commencement	Cessation	
01	First Session	1/07/2022	30/11/2022	
02	First TermVacation	24/10/2022	08/11/2022	
03	Teaching Days (Even Semesters)	25/07/2022	30/11/2022	
04	WinterVacation	24/10/2022	08/11/2022	
05	Second Session	23/01/2023	27/05/2023	
06	Summer Vacation	29/05/2023	01/07/2023	
07	Commencement of next Academic session	03/07/2023		

Sr. No.	Public Holiday	Day & Date
01	Moharam	Tuesday 09 August 2022
02	Rakshabandhan	Thursday 11 August 2022
03	Independence Day	Monday, 15 August, 2022
04	Parsi New Year	Tuesday 16 August 2022
05	Ganesh Chaturthi	Wednesday,31 August, 2022
06	Anant Chaturdashi	Friday 09 September 2022
07	Dasara	Weneday,05 Octoberr,2022
08	Republic Day	Thursday, 26 January, 2023
09	Mahashivratri	Saturday 18,February 2023
10	Holi (Second Day)	Tuesday, 07, March, 2023
11	Gudhipadwa	Wenesday 22, March, 2023
12	Shriram Navami	Thursday 30,March,2023
13	Mahavir Jayanti	Tuesday, 04,April, 2023
14	Good Friday	Friday,07,April, 2023
15	Dr. BabasahebAmbedkarJayanti	Friday, 14 April, 2023
16	Ramzan id	Saturday,22 April,2023
17	Maharashtra Din	Monday,01 May,2023
18	Bauddha Pournima	Friday,05 May,2023

Teaching Periods Available per month during the session 2022-23

Faculty : ARTS

Subject : Economics

			ODD SEMESTER								EVEN SEMESTER					
Class	Periods	JULY-22	AUG-21	SEPT-21	OCT-21	NOV-21	DEC-21	JAN-22	Total	JAN-22	FEB-22	MAR-22	April-22	MAY-22	JUN-22	Total
BA I	Theory	15	19	21	14	16	01	9	95	00	6	28	27	10	00	71
BA II	Theory	00	13	20	16	16	0	9	74	00	6	27	26	7	00	66
BA III	Theory	00	12	21	16	15	01	10	75	00	6	28	26	7	00	67
MA I	Theory	00	00	13	12	12	18	16+2	73	00	6	18	17	7	00	48

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TEACHING PLAN OF DEPARTMENT OF ECONOMICS			
Theory BA SEM I	Sr. No.	Topic to be covered	Lectures Available
	01	Introduction to Economics	20
	02	Demand and Supply	18
	03	Cost and Revenue Analysis	19
	04	Market Structures	20
	05	Factors of Production	18
Theory BA SEM II	Sr. No.	Topic to be covered	Lectures Available
	01	Geographical and Economy Features of Maharashtra	15
	02	Population Features of Maharashtra	14
	03	Agricultural Economy	14
	04	Industry and Infrastructure in Maharashtra	13
	05	Economy of Vidarbha	15
Theory BA SEM III	Sr. No.	Topic to be covered	Lectures Available
	01	Introduction to Macro Economics	15
	02	Money and Value of Money	14
	03	Inflation and Deflation	15
	04	Production and Employment	15
	05	International Trade	15
Theory BA SEM IV	Sr. No.	Topic to be covered	Lectures Available
	01	Commercial bank	14
	02	Central Bank	13
	03	Co-operative Bank and Nabard	12
	04	International Monetary Fund & World Bank	13
	05	Recent Servicesin banking Sector	14
Theory BA SEM V	Sr. No.	Topic to be covered	Lectures Available
	01	Indian Economy and Planning	15
	02	Agriculture	15
	03	Industry	15
	04	External sectors and important areas of concern	14
	05	Environment and pollution	16
Theory BA SEM VI	Sr. No.	Topic to be covered	Lectures Available
	01	Introduction of Demography	14
	02	Fertality and Mortality	13
	03	Migration of population	13
	04	Urbanization of population	13
	05	Population and Development	14
Theory M.A.I SEM I	1	Micro Economics-I	73
	2	Macro Economics-I	71
	3	Agriculture Economics	75
	4	Public Economics	74
Theory M.A.I SEM II	1	Micro Economics-II	48
	2	Macro Economics-II	54
	3	Industrial Economics	49
	4	Environmental Economics	49

ACADEMIC ACTION PLAN 2022-23

Department of Economics

01	Name of the Department		Economics
02	Name of faculty members with qualification		Dr.SubhashGurjar (M.A.Eco,M.phil,Ph.d,SET)
03	Refresher Course/ Orientation Program/ Short Term Course/ Any Others		01
04	Research Publication	i) Book Publication	01
		ii) Chapter in Book	01
		iii) Research Articles in UGC CARE listed Journal	01
		iv) Research Paper in conference/ seminar (Presentation)	02
		v) Research Paper in conference/ seminar proceeding (Publication)	01
		vi) Conference/ Seminar/ Workshop (To be attended)	03
		vii) Resource Person/ Chairperson	01
		viii) Ph. D registered/Ongoing/Awarded	Awarded
		xv) Ph. D guide and no. of students registered /to be registered under	Ph.d Guide
		xvi) Minor/ Major Project	---
05	Conference/ Seminar/ Workshop (To be organized)		01
06	Collaboration		01
07	Consultancy		Nil
08	Extension Activities and Social Responsibility		Social awareness program
09	Academic Activities to be organized (Guest lecture, class room seminar, contest, education tour, celebration of birth and death anniversary of national leaders, no. of visiting & guest faculties etc.)		Guest lecture :- 01 Seminar :- 02 Education tour :- 02 Bank visit :- 01 Farm visit :- 01
10	Innovative and Best Practices • Name of the title of the practice. • Introduction • Objectives • Theme/ context • The practice • Evidence of success • Problems encountered and resources required		Banking awareness
11	Any other if you wish to add		---
12	Curriculum Enrichment (Draft the letter to the concerned BOS of University)		Paper setting Moderation Discuss the syllabus

ARTS AND COMMERCE COLLEGE
Warwat Bakal, Dist- Buldana
Department of Economics

Perspective Plan for Curriculum Implementation 2022-23

BA Part I SEM I		
Unit	Available Lectures	Duration
I Introduction to Economics	18 periods	August 30 to September 2021
II Demand & Supply	18 periods	September 2021 to October 2021
III Cost & Revenue	17 periods	November to December 2021
IV Market Structures	17 periods	December 2021 to January 2022
V Factors of Production	17 periods	January 2022
BA Part II SEM III		
Unit	Available Lectures	Duration
I Introduction to Macro Economics	10 periods	August 30 to September 2021
II Money &Value of Money	10 periods	September 2021 to October 2021
III Inflation &Deflation	10 periods	November to December 2021
IV Production & Employment	11 periods	December 2021 to January 2022
V International Trade	09 periods	January 2022
BA Part III SEM V		
Unit	Available Lectures	Duration
I Indian Economy and Planning	12 periods	August 30 to September 2021
II Agriculture	11 periods	September 2021 to October 2021
III Industry	11 periods	November to December 2021
IV External Sectors & Important areas of concern	11 periods	December 2021 to January 2022
V Environment and pollution	11 periods	January to February 2022
BA Part I SEM II		
Unit	Available Lectures	Duration
I Geographical & Economy Features of Maharashtra	18 periods	January to February 2022
II Population features of Maharashtra	18 periods	February to March 2022
III Agricultural Economy	17 periods	March to April 2022
IV Industry & Infrastructure in Maharashtra	17 periods	April To MAY 2022
V Economy of Maharashtra	18 periods	MAY 2022
BA Part II SEM IV		
Unit	Available Lectures	Duration
I Commercial Bank	18 periods	January to February 2022
II Central Bank	18 periods	February to March 2022
III Co-operative Bank &Nabard	18 periods	March to April 2022
IV International Monetary fund & World Bank	17 periods	April To MAY 2022
V Recent services in Banking sector	17 periods	MAY 2022
BA Part III SEM VI		
Unit	Available Lectures	Duration
I Introduction of Demography	18 periods	January to February 2022
II Fertality and Mortality	17 periods	February to March 2022
III Migration of Population	18 periods	March to April 2022
IV Urbanization of Population	17 periods	April To MAY 2022
V Population and Development	18 periods	MAY 2022

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Department of Economics

Perspective Plan for Co-curricular Activities 2022-23

Sr. No.	Activity	Tentative Duration
1.	Welcome Program of First year students	Third Week of September 2022
2.	Book published	September 2022
3.	Quiz Competition of Banking	October 2022
4.	Study Circle Formation of Economics	October 2022
5.	Celebration of National consumer day	24 December 2022
6.	Bank Visit	Last week of December 2022
7.	Celebration of World consumer day	15 March 2023
8.	Farm Visit	April 2023

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WARVAT BAKAL DIST- BULDANA

DEPARTMENT OF HISTORY

DEPRTMENTAL ACADEMIC CALENDAR 2022-23

ARTS & COMMERCE COLLEGE, WARVAT BAKAL

ACADEMIC CALENDER 2022 – 2023

(Vide the direction number 74/2022 dated 26th June, 2022)

(Academic Calendar for the Academic Session 2022 - 23 was published by University vide Notification No. 74/2022. And IQAC in its Meeting dated. ..... vide resolution No. ..... approved the Academic Calendar for the session 2022-23 as...

Sr. No.	Particular	From	To
1.	First Session	01st July, 2022	30th November, 2022
2.	Diwali Vacation	24th October, 2022	08th November, 2022
3.	Second Session	23rd January, 2023	13th May, 2023
4.	Summer Vacation	15th May, 2023	01st July 2023

Departmental Academic Calendar (2022-23)

Sr. No.	Activity	Commencement	Cessation	Total Days
01	First Session	01/07/2022	30/11/2022	110
02	Admission Process	03/07/2022	16/07/2022	14
03	Teaching Days(Odd Semesters)	25/07/2022	22/10/2022	71
		09/11/2022	30/11/2022	19
				90
04	Induction Program for First Year Students	18/07/2022	23/07/2022	06
05	First Term Vacation	24/10/2022	08/11/2022	16
06	Odd Semesters University Exam	01/12/2022	21/01/2023	45
07	Academic Session (Second Session)	23/01/2023	13/05/2023	
08	Teaching Days (Even Semesters)	01/02/2023	04/05/2023	93
09	Second Term Vacation	15/05/2023	01/07/2023	46
10	Even Semesters University Exam	06/05/2023	01/07/2023	55
11	Commencement of next Academic session	03/07/2023		

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Sr. No.	Public Holiday	Day & Date
01	Moharam	Tuesday, 9th August, 2022
02	Rakshabandhan	Thursday 11th August, 2022
03	Independence Day	Monday, 15th August, 2022
04	Parsi New Year	Tuesday, 16th August, 2022
05	Shri Ganesh Chaturthi	Wednesday, 31st August, 2022
06	Anant Chaturthi	Friday, 9th September, 2022
07	Dasara	Wednesday, 5th October, 2022
08	Republic Day	Thursday, 26th January, 2023
09	Mahashivratri	Saturday, 18th February, 2023
10	Holi (Second Day)	Tuesday, 7th March ,2023
11	Gudhi Padwa	Wednesday, 22nd March, 2023
12	Shriram Navmi	Thursday, 30th March, 2023
13	Mahavir Jayanti	Tuesday, 4th , March, 2023
14	Good Friday	Friday, 7th April, 2023
15	Dr. Babasaheb Ambedkar Jayanti	Friday, 14TH April, 2023
16	Ramzan ID (Id-Ul-Fitar)	Saturday, 22nd April, 2023
17	Maharashtra Day	Monday, 1st April, 2023
18	Buddha Pournima	Friday, 5th May, 2023

TIME TABLE

Faculty : ARTS Subject : HISTORY

Period	1	2	3	4	5	6
Day / Time	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	1:34 to 2:22	2:22 to 3:10	3:10 to 3:58
MON		B.A. II		B.A.I	B.A. III	
TUE		B.A. I		B.A. II	B.A. III	
WED	B.A. III				B.A.II	B.A. I
THUS	B.A. II	B.A. I				
FRI	B.A. I		B.A. III			
SAT	B.A. III	B.A. II				

ALLOTTED WORKLOAD

Subject :HISTORY Year : 2022-23

Sr. No.	Class	No. of periods per week			Paper Allotted
		Lectures	Tutorials	Practical	
1	BA I (A)	05	--	--	
2	BA II	05	--	--	
3	BA III	05	--	--	

Total Workload per week (L+T+P) : 15 (L) = 15 (12 Hrs)

Teaching Periods Available per month during the session 2022-23

Faculty :ARTS

Subject : HISTORY

Class	Periods	JUL-22	AUG-22	SEP-22	OCT -22	NOV -22	Total	FEB-23	MAR-23	APR-23	MAY-23	Total
BA I	Theory	05	20	23	14	16	78	21	26	25	05	77
	Tutorial	--	--	--	--	--	--	--	--	--	--	--
BA II	Theory	05	23	22	15	17	82	21	26	26	05	78
	Tutorial	--	--	--	--	--	--	--	--	--	--	--
BA III	Theory	05	22	21	14	16	78	21	26	26	05	78
	Tutorial	--		--	--	--	--	--	--	--	--	

Teaching Plan for Theory Available Period During the Session 2022-23

(B.A. Part-I, Semester-I)

Teaching Plan for Theory (First Semester) Class : B. A. Part - I (History of India Earliest Time to 700 A.D.)				
Sr. No.	Unit	Topic to be covered	Lectures Available	Lectures Utilized
01	Unit -I	1) Survey of the Sources of Ancient India	20	
		2) Harppan Civilization		
		3) Vedic Age		
02	Unit -II	1) Rise of Religious Movement	18	
		2) Mouryan Dynasties		
03	Unit -III	1) Mouryan and Post Mauryan Period	10	
		2) Shungas, Satavahanas, Kushan		
04	Unit -IV	1) Gupta Dynasty	15	
		2) Vakatak Dynasty		
		1) Vardhan Empire		
05	Unit -V	1) Educational in Ancient India	15	
		2) Position of the Women in Ancient India		
		3) Judicial Administration in Ancient India		

(B.A. Part-I, Semester-II)

Teaching Plan for Theory (Second Semester) Class : B.A. Part - I (History of India from 701 to 1526 A.D)				
Sr. No.	Unit	Topic to be covered	Lecture Available	Lecture Utilized
01	Unit -I	1)Arab and Turkas invasion	20	
		2) Estabalishment of Saltanat		

		3) Qutbuddin Aibak		
		4) Balban		
02	Unit -II	1) Allauddin Khilji's Political and Administrative Policy	25	
		2) Allauddin Khilji's Economic Policy		
		3) Mahammad Tughaluq		
		4) Firoz Shah Tughaluq		
		5) Invasion of Timur		
		6) The Sayyids, Lodis and The Decline of the Sultanate		
03	Unit -III	1) The Bahamani Kingdom	10	
		2) The Vijaynagar Kingdom		
04	Unit -IV	1) Political Structure During Sultanate Period	12	
		2) State and Society		
		3) Social Status of Women		
05	Unit -V	1) Economic and Technological Development	10	
		2) Arts and Education		
		3) Religious Movement		

(B.A. Part-II, Semester-III)

Teaching Plan for Theory (Third Semester), Class : B. A. Part- II, (History of India From 1526 to 1756 A.D.				
Sr. No.	Unit	Topic to be covered	Lectures Available	Lectures Utilized
01	Unit -I	1) Survey of the Sources of Medieval India	20	
		2) Establishment and Cansolidation of Mughal Empire		
		3) Mughal Policy		
02	Unit -II	1) Mughal Ruling Classes	17	
		2) Mughals Relation with India Power		
		3) Declined of Mughal Empire		
03	Unit -III	*1) Mughal Economy*	15	
		2) Mughal Society		
		3) Religion		
		4) Cultural Life		
04	Unit -IV	1) Sources of Maratha History	15	
		2) Emergence of Maratha Power		
		3) Maratha Power Under Shivaji		
		4) Maratha Power Under Sambhaji		
		5) The Maratha War of Indipendence		
05	Unit - V	1) Political Administration Under Maratha	15	
		2) Military System Under Maratha		
		3) Judicial Administration Under Maratha		
		4) Fiscal Administration of Maratha		
		5) Religious Policy of Maratha		

(B.A. Part-II, Semester-IV)

Teaching Plan for Theory (Forth Semester) Class : B. A. Part - II (History of India From 1757 to 1947 A.D.)				
Sr. No.	Unit	Topic to be covered	Lectures Available	Lectures Utilized
01	Unit -I	1) Advent of European Power	20	
		2) Tool of Expansion of British Dominion in India		
		3) Economic Changes		
02	Unit -II	1) Revolt of 1857	15	
		2) Socio-religious Movement		
		3) Modern Education		
03	Unit -III	1) Nationalism	13	
		2) India National Congres (Early Phase)		
		3) India National Congres (Leter Phase)		
04	Unit - IV	1) Early Gandhian Programme	15	
		2) Non Co-oparation Movement		
		3) Civil Disobedience Movement		
		4) Quite India Movement		
05	Unit - V	1) Constitutional Development	15	
		2) Revolutionary Movement		
		3) Subhashchandra Bose and Azad Hind Army		
		4) India Towards Indipendence		

(B.A. Part-III, Semester-V)

Teaching Plan for Theory (Fifth Semester) Class : B. A. Part - III (History of Modern World From 1780 to 1920 A.D.)				
Sr. No.	Unit	Topic to be covered	Lectures Available	Lectures Utilized
01	Unit - I	1) French Revolution	20	
		2) Emergence of Nepolian Bonaparte		
		3) Congress of Vienna 1815 A.D.		
02	Unit - II	1) Making of the Nation	15	
		2) Foreign policy of Germany Under Bismarck		
		3) Germany Under Kaiser William II		
03	Unit - III	1) Triple Entente	10	
		2) Russo-Japan War		
		3) First World War		
04	Unit - IV	1) The Entry of USA In to First World War	16	
		2) Concept of Communism, Capitalism , Socialism		
		3) The Russian Revolution		
05	Unit - V	1)Paris Peace conference	17	
		2) Versailles Treaty And Other		
		3) The League of Nation Aims, Objective, Structure		

(B.A. Part-III, Semester-VI)

Teaching Plan for Theory (Sixth Semester) Class : B. A. Part - III (History of Modern World From 1921 to 1965 A.D.)				
Sr. No.	Unit	Topic to be covered	Lectures Available	Lectures Utilized
1	Unit-I	1)Rise of Fascism in Italy	20	
		2)Rise of Nazism in Germany		
		3)Rise of Stalin in Russia		
		4)The Great Economic Depression 1929		
2	Unit-II	1)Causes and Result of Second World War	15	
		2) Entry of the USA into the Second World War		
		3)Diplomatic Conferences during the War Period		
3	Unit-III	1)United Nations Organization	15	
		2)The Emergence of the USA as world Power		
		3)The Emergence of the USSR as World Power		
4	Unit-VI	1)Post War World.	13	
		2)The Doctrine, The Marshal Plan, Point Four Programme		
		3)Military Alliances – NATO, SEATO, CENTO, Warsaw		
5	Unit-V	1)The Suez Crisis.	15	
		2)European Unity and Disunity, European Common Market, Common Wealth of Nation, The Berlin Crisis, Quba Crisis		

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PROGRAMS SCHEDULE (2022-23)

Sr. No.	Particulars	To be organized in
01	Study Circle Formation	SEPTEMBER 2022
02	Guest Lecture	OCTOBER 2022 & FEBRUARY 2023
03	Educational Tour	FEBRURY 2023
04	Debate	OCTOBER 2022 & MARCH 2023
05	Elocution	NOVEMBER 2020 & MARCH 2021
06	Seminar	SEPTEMBER 2020 & MARCH 2021
07	Group Discussion	OCTOBER 2020 & MARCH 2021

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SATPUDA EDUCATION SOCIETY, JALGAON (JAMOD)'S

ARTS & COMMERCE COLLEGE

WARVAT BAKAL DIST- BULDANA

DEPARTMENT OF POL-SCIENCE

DEPRTMENTAL ACADEMIC CALENDAR 2022-23

Departmental Academic Calendar (2022-2023)

Sr. No.	Activity	Commencement	Cessation	TotalDays
01	FirstSession	01/07/2022	30/11/2022	110
02	AdmissionProcess	01/07/2022	16/07/2022	14
03	TeachingDays(OddSemesters)	27/09/2021	15/01/2022	90
04	Academic Session (Second Session)	25/07/2022	22/10/2022	109
05	Induction Program for FirstYearStudents	18/07/2022	23/07/2022	06
06	FirstTermVacation	24/10/2022	08/11/2022	16
07	Odd Semesters UniversityExam	01/12/2022	21/01/2023	45
09	Teaching Days (Even-Semester	23/01/2023	27/05/2023	98
10	SecondTermVacation	29/05/2023	01/07/2023	29
11	Even Semesters UniversityExam	29/05/2023	01/07/2023	30
12	CommencementofnextAcademic Session-2023-2024	03/07/2023		

Sr. No.	Public Holiday	Day & Date
01	Moharum	Tuesday 09 Augest 2022
02	Rakshabandhan	Thursday 11 August 2022
03	Independence Day	Monday 15 August 2022
04	Parsi New Year	Tuesday 16 August 2022
05	Shri Ganesh Chaturhi	Wednesday 31 August 2022
06	Anant Chaturdashi	Friday 09 September 2022
07	Dasara	Wednesday05 October 2022
08	Republic Day	Thursday 26 January 2023
09	Mahashivratri	Saturday 18 February 2023
10	Holi (second day)	Tuesday 07 March 2023
11	Gudhipadava	Saturday 22 March 2023
12	Shriram Navami	Thursday 30 March, 2023
13	Mahivir Jayanti	Tuesday 04 April 2023
14	Good Friday	Friday 07 April 2023
15	Dr. Babasaheb Ambedkar Jayanti	Friday 14 April 2023
16	Ramzan Id	Saturday 22 April 2023

17.Maharashtra DayMonday 01 May 2023

18 Buddha Purnima Friday 05 May 2023

Time Table

Faculty :Humanities **Subject : Poi-Science**

Period	1	2	3	4	5	6
Day / Time	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	1:34 to 2:22	2:22 to 3:10	3:10 to 3:58
MON	II	III			I	
TUE	I		II	III		
WED		I	III			
THUS	III	I	II			
FRI			II	III		
SAT	II			I		

Allotted Workload **Subject : Pol-Science** **Year : 2022-2023**

Sr. No.	Class	No. of periods per week			Paper Allotted
		Lectures	Tutorials	Practical	
1	BA I (A)	05	-	----	
2	BA II	05	-	----	
3	BA III	05	-	----	
	Total	15	----	-	

Total Workload per week – 15 Period

Teaching Periods Available per month during the session 2022-2023

Faculty :Humanity **Subject : Pol-Science**

		ODD SEMESTER								EVEN SEMESTER						
Class	Periods	AUG-22	SEPT-22	OCT-22	NOV-22	DEC-22	JAN-23	TOTAL	FEB-23	MAR-23	APR-23	MAY-23	JUN-23			Total
BA I	Theory	-	12	16	15	16	10	69	16	18	19	20	-	-		73
BA II	Theory	-	10	15	14	15	09	63	15	16	21	18	-	-		70
BA III	Theory	-	12	14	15	13	10	64	16	14	20	17	-	-		67

TEACHING PLAN-2022-2023

DEPARTMENT OF POLITICAL-SCIENCE

Teaching Plan for Theory Class : B A Part I - (First Semester)		SUB : Pol-Science	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Unit-I	21	
02	Unit-II	19	
03	Unit-III	20	
04	Unit-IV	19	
05	Unit-V	20	
Teaching Plan for Theory Class : B A Part I - (Second Semester)		**SUB : Pol-Science**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Election Commission of India	18	
02	State Executive	15	
03	State Legislature of Maharashtra	13	
04	Local Seif Government of Maharashtra	14	
05	Women Participation in Panchayat Raj	15	
Teaching Plan for Theory Class : B A Part II -(Third Semester)		**SUB: Pol-Science**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Constitution of U.K.	20	
02	Parliamentary System of U.K.	19	
03	Constitution of U.S.A.	20	
04	Legislature of U.S.A.	19	
05	SAARC	20	
Teaching Plan for Theory Class : B A Part II (Fourth Semester)		**SUB ; Pol-Science**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Constitution Of CHINA	18	
02	Executive Of China	15	
03	United Nation Organization (UNO)	14	
04	Strcture of UNO	14	
05	Indo-China Relations –Major Issues	15	
Teaching Plan for Theory Class : B A Part III (Fifth Semester)		**SUB : Pol-Science**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Leadership	21	
02	Reservation	19	
03	Nationalism	20	
04	Communalism	19	
05	Terrorism	20	
Teaching Plan for TheoryClass : B A III (Sixth Semester)		**SUB : Pol-Science**	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Concept of State	18	
02	Concept of Democracy	15	
03	Concept of Nationalism	13	
04	Concept of Socialism	14	
05	Behaviouralism and Sovereignty	15	

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PROGRAMS SCHEDULE (2022- 23)

Sr. No.	Particulars	To be organized in	
01	Constitutional Day	26 November 2022	
02	Human Rights Day	10 December 2022	
03	Study Forum	18 December 2022	
04	National Essay Competition	11 January 2023	

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SATPUDA EDUCATION SOCIETY, JALGAON JAMODI'S

ARTS & COMMERCE COLLEGE

WARVAT BAKAL DIST- BULDANA

DEPARTMENT OF ENGLISH

DEPRTMENTAL ACADEMIC CALENDAR 2022-23

ARTS AND COMMERCE COLLEGE

Warvat Bakal Dist- Buldana

Department of English

2022-23

Departmental Academic Calendar (2022-23)

Sr. No.	Activity	Commencement	Cessation	Total Days
01	First Session	01/07/2022	30/11/2022	110
02	Admission Process	01/07/2022	16/07/2022	14
03	Teaching Days(Odd Semesters)	25/07/2022 09/11/2022	22/10/2022 30/11/2022	71 19
				90
04	Induction Program for First Year Students	18/07/2022	23/07/2022	06
05	First Term Vacation	24/10/2022	08/11/2022	16
06	Odd Semesters University Exam	01/12/2022	21/01/2023	45
07	Academic Session (Second Session)	23/01/2023	31/01/2023	7
08	Teaching Days (Even Semesters)	01/02/2023	27/05/2023	91
09	Second Term Vacation	29/05/2023	01/07/2023	34
10	Even Semesters University Exam	29/05/2023	01/07/2023	29
11	Commencement of next Academic session	03/07/2023		

Sr. No.	Public Holiday	Day & Date
01	Moharam	Tuesday, 9th August, 2022
02	Rakshabandhan	Thursday 11th August, 2022
03	Independence Day	Monday, 15th August, 2022
04	Parsi New Year	Tuesday, 16th August, 2022
05	Shri Ganesh Chaturthi	Wednesday, 31st August, 2022
06	Anant Chaturthi	Friday, 9th September, 2022
07	Dasara	Wednesday, 5th October, 2022
08	Republic Day	Thursday, 26th January, 2023
09	Mahashivratri	Saturday, 18th February, 2023
10	Holi (Second Day)	Tuesday, 7th March ,2023
11	Gudhi Padwa	Wednesday, 22nd March, 2023
12	Shriram Navmi	Thursday, 30th March, 2023
13	Mahavir Jayanti	Tuesday, 4th , March, 2023
14	Good Friday	Friday, 7th April, 2023
15	Dr. Babasaheb Ambedkar Jayanti	Friday, 14TH April, 2023
16	Ramzan ID (Id-Ul-Fitar)	Saturday, 22nd April, 2023
17	Maharashtra Day	Monday, 1st April, 2023
18	Buddha Pournima	Friday, 5th May, 2023

Time Table

Faculty: Commerce & Science

Subject: ENGLISH

Period	1	2	3	4	5	6
Day / Time	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	1:34 to 2:22	2:22 to 3:10	3:10 to 3:58
MON	B.com I			B.Com III	B.com II	B.com I (T)
TUE	B.com I			B.sc I	B.com I (T)	
WED	B.com I			B.sc I		B.com I (T)
THUS	B.com I		B.Com III	B.sc I		B.com I (T)
FRI	B.com II			B.sc I	B.com I (T)	
SAT	B.com II		B.Com III	B.com I (T)		B.sc I (T)

Allotted Workload

Subject: ENGLISH

Year: 2022-23

Sr. No.	Class	No. of periods per week			Paper Allotted
		Lectures	Tutorials	Practical	
1	B.Com I	04	06	----	
2	B.Com II	03	----	----	
3	B.Com III	03	-----	----	
4	B.sc I	04	01	-----	

Total Workload per week (L+T): 14 (L) + 08 (T) = 21 (16 hrs. 08b m)

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Faculty: Commerce & Science

Subject: ENGLISH

Class	Periods	July-22	AUG-22	SEPT -22	OCT -22	NOV -22	DEC -22	JAN -23	Total	Feb-23	Mar-23	Apr-23	May -23	Total
		ODD SEMESTER								EVEN SEMESTER				
B.Com I	Theory			04	16	14	18	08	60	16	18	15	15	64
	Tutorial			05	26	23	28	16	98	26	25	25	25	101
B.Com II	Theory			02	12	11	12	07	44	11	11	12	12	46
	Tutorial								---					---
B.Com III	Theory			02	12	10	12	07	43	11	13	11	12	47
	Tutorial								---					---
B.Sc. I	Theory			04	15	14	19	08	60	16	16	15	16	60
	Tutorial			01	04	04	03	03	15	03	04	04	04	15

Perspective Plan for Curriculum Implementation 2022-23

B.COM Part I SEM I		
Unit	Available Lectures	Duration
I Prose	30 Periods	September 2022 to November 2022
II Poetry	30 periods	Septembers 2022 to January 2023
III Grammar	28 periods	September 2022 to January 2023
IV Written Communication	30 periods	September 2022 to October 2023
Soft Skills	20 periods	November 2022 to January 2023
Internal Assessment	20 periods	November 2022 to January 2023
B.COM Part II SEM III		
Unit	Available Lectures	Duration
I Prose	16 periods	September 2022 to January 2023
II Poetry	16 periods	September 2022 to November 2023
III Communication Skill	04 periods	November 2022 to January 2023
IV Internal Assessment	08 periods	September 2022 to January 2023
B.COM Part III SEM V		
Unit	Available Lectures	Duration
I Prose	15 periods	September 2022 to January 2023
II Poetry	15 periods	September 2022 to

		November 2022
III Communication Skill	08 periods	September 2022 to November 2023
IV Internal Assessment	05 periods	September 2022 to January 2023
B.COM Part I SEM II		
Unit	Available Lectures	Duration
I Prose	30 periods	February 2023 to March 2023
II Poetry	31 periods	February to May 2023
III Grammar	36 periods	February 2023 to march 2023
IV Written Communication	28 periods	February 2023 to May2023
Soft Skills	20 periods	February 2023 to March 2023
Internal Assessment	20 Periods	February 2023 to March 2023
B.COM Part II SEM IV		
Unit	Available Lectures	Duration
I Prose	15 periods	February2023 to May2023
II Poetry	15 periods	February to April 2023
III Communication Skill	08 periods	February 23 to march 23
IV Internal Assessment	08 periods	April to May 2023
B.COM Part III SEM VI		
Unit	Available Lectures	Duration
I Prose	16 periods	February 2023 to March 2023
II Poetry	15 periods	February to May 2023
III Communication Skill	08 periods	February 2023 to April 2023
IV Internal Assessment	08 periods	April to May 2023

B.SC Part I SEM I		
Unit	Available Lectures	Duration
I Prose	18 periods	February 2023 to March 2023
II Poetry	18 periods	February 2023 to May 2023
III Writing Skills	12 periods	February 2023 to April 2023
IV Communication Skills	12 periods	April 2023 to May 2023
V Skill Enhancement Module (SEM)	15 periods	March 2023 to May2023
B.SC Part I SEM II		
Unit	Available Lectures	Duration
I Prose	18 periods	February 2023 to March 2023
II Poetry	18 periods	February to May 2023
III Writing Skills	12 periods	February 2023 to April 2023
IV Communication Skills	12 periods	April 2023 to May 2023
V Skill Enhancement Module (SEM)	15 periods	March 2023 to May 2023

Teaching Plan for Theory & Tutorial (First Semester)		Class : B.Com I	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Commerce Education : Key to Prosperity and Security - Dr. Manjushree Sardeshpande	03	
02	Dhirubhai Ambani	02	
03	A R Rahman	02	
04	The Romance of A Busy Broker by O. Henry	03	
05	Stay Calm - Grenville Kleiser	03	
06	All the World's A Stage - William Shakespeare	02	
07	Trees - Joyce Kilmer	02	
08	Bright Star - John Keats	03	
09	Articles	02	
10	Parts of Speech	04	
11	Word Formation	04	
12	letter Writing	04	
13	Report Writing	03	
14	Resume	03	
15	Critical, Creative and Positive Thinking	03	
16	Building Relationship Skills	03	
17	Problem Solving Skills	02	
18	Skill Enhancement Module How to open a DMAT account	10	
19	BC-11 English (Business Communication Skill in English Language) AE Assignment (Internal Assessment)	98	

Teaching Plan for Theory & Tutorial (Second Semester)		Class : B.com I	
Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Sudha Murthy	03	

02	Devender Pal Singh	02	
03	Jadav Payeng	02	
04	Spoken English and Broken English – G.B Shaw	03	
05	Why a Start-up Needs to Find its Customers First-Pranav Jain	03	
06	Rahul Bajaj	02	
07	Sreelakshmi Suresh	02	
08	The Eyes Are Not Here by Ruskin Bond	03	
09	Tenses	02	
10	Voices	04	
11	Narration	04	
12	Notice	04	
13	Agenda	03	
14	Minutes	03	
15	Goal Setting	03	
16	Presentation Skills	03	
17	Time Management	02	
18	Visit to Bank or Industry	10	
19	BC-21 -English (Business Communication Skill in English) AEC Assignment (Internal Assessment)	101	

Teaching Plan for Theory (Third Semester) **Class : B.com II**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Travel By Train	05	
02	Two Gentlemen of Verona	05	
03	Go! Kiss the World	05	
04	The Struggle for an Education Up From slavery	05	
05	Where the Mind is without Fear	04	
06	Stopping by Woods on a Snowy evening	04	

07	Leisure	04	
08	The Daffodils	04	
09	An Introduction to Communication	02	
10	Notice, Agenda, Minutes	03	
11	Presentations	03	

Teaching Plan for Theory (Fourth Semester) **Class : B.com II**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	The Town Week	05	
02	Florence Nightingale	05	
03	The Gift of Magi	05	
04	Three Hermits	05	
05	On His Blindness	04	
06	Solitude	04	
07	Still I Rise	04	
08	Money Madness	04	
09	Interview and Interviewing Skills	04	
10	Meeting Skills	03	
11	Nonverbal Communication	03	

Teaching Plan for Theory (Fifth Semester) **Class : B.com III**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Ratan Tata	05	
02	Steve Jobs	05	
03	Vijay Bhatkar	05	
04	Black Money Black Economy	05	
05	Red Red Rose	04	
06	It is needless to ask the Saint Caste	04	
07	Love's Philosophy	04	
08	The Garden	04	
09	Paperless Office	03	
10	Video Conferencing	02	

11	E-Banking	02	

Teaching Plan for Theory (Sixth Semester) **Class : B.com III**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Sundar Pichai	05	
02	Mallika Srinivasan	05	
03	Muhammad Yunus	05	
04	Introduction to the Right to information Act	05	
05	All World's a Stage	04	
06	How do I Love Thee	04	
07	The Duck and The Kangaroo	04	
08	Ode to Autumn	04	
09	Leadership Skills	02	
10	Teamwork Skills	02	
11	Time Management Skills	02	
12	Stress Management Skills	03	
13	Advertising	02	

Teaching Plan for Theory (First Semester) **Class : B.sc I**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	Appro JRD – Sudha Murthy	05	
02	All about a Dog – A. G. Gardiner	04	
03	The Power of Prayer – APJ Abdul Kalam	05	
04	Model Millionaire – Oscar Wilde	04	
05	Daffodils – William Wordsworth	05	
06	Leisure – W. H. Davies	04	
07	Stay Calm – Grenville Kleiser	05	
08	The Mountain and the Squirrel - Ralph W. Emerson	04	
09	Preparing a CV	03	
10	Applying for a Job	03	
11	Narrating an Experience	03	

12	Creative Writing (Expansion of idea)	03	
13	Non –Verbal Communication	06	
14	Preparing a Newspaper Report	06	
15	Spot Visit and preparing a report	07	
16	Interview of a dignitary and writing a report in dialogue form	08	

Teaching Plan for Theory (Second Semester) **Class : B.sc I**

Sr. No.	Topic to be covered	Lectures Available	Lectures Utilized
01	The Last Leaf – O' Henry	05	
02	Of Studies – Francis Bacon	04	
03	Why is the Sea Blue? – G. Venkatraman	05	
04	The Mute Companion - R. K. Narayan	04	
05	Treasured Moments – Manjushree Sardeshpande	05	
06	Ode on a Grecian Urn – John Keats	04	
07	Leave this Chanting and Singing – Ravindranath Tagore	05	
08	How do I love thee? – Elizabeth Barrett Browning	04	
09	Introducing Yourself	03	
10	Introducing People to Others	03	
11	Interviews	03	
12	Describing Daily Routine	03	
13	Verbal Communication	06	
14	Précis Writing	06	
15	Blog Writing	07	
16	Presentation on a topic from prescribed prose/poem	08	

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PROGRAMS SCHEDULE (2022 - 23)

Sr. No.	Particulars	To be organized in
01	Student Induction Program	
02	Teacher Day celebrates	05/09/2022
03	Personality Development Program	
04	Study Circle Formation	
05	Certificate Course in Enhancing Competence in English.	
06	Developing Elocution skill session	
07	William Shakespeare Death Anniversary	23/04//2023
09	Writing Skill Session	
10	Reading Skill Enhancement Program	

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SATPUDA EDUCATION SOCIETY, JALGAON (JAMOD)'S

ARTS & COMMERCE COLLEGE

WARVAT BAKAL DIST- BULDANA

DEPARTMENT OF MARATHI

DEPRTMENTAL ACADEMIC CALENDAR 2022-23

Departmental Academic Calendar (2022-2023)

Sr. No.	Activity	Commencement	Cessation	TotalDays
01	First Session	01/07/2022	30/11/2022	110
02	Admission Process	01/07/2022	16/07/2022	14
03	Teaching Days(Odd Semesters)	27/09/2022	15/01/2023	90
04	Academic Session (Second Session)	25/07/2022	22/10/2022	109
05	Induction Program for First Year Students	18/07/2022	23/07/2022	06
06	First Term Vacation	24/10/2022	08/11/2022	16
07	Odd Semesters University Exam	01/12/2022	21/01/2023	45
09	Teaching Days (Even-Semester	23/01/2023	27/05/2023	98
10	Second Term Vacation	29/05/2023	01/07/2023	29
11	Even Semesters University Exam	29/05/2023	01/07/2023	30
12	Commencement of next Academic Session-2023-2024	03/07/2023		

Sr. No.	Public Holiday	Day & Date
01	Moharum	Tuesday 09 Augest 2022
02	Rakshabandhan	Thursday 11 August 2022
03	Independence Day	Monday 15 August 2022
04	Parsi New Year	Tuesday 16 August 2022
05	Shri Ganesh Chaturhi	Wednesday 31 August 2022
06	Anant Chaturdashi	Friday 09 September 2022
07	Dasara	Wednesday 05 October 2022
08	Republic Day	Thursday 26 January 2023
09	Mahashivratri	Saturday 18 February 2023
10	Holi (second day)	Tuesday 07 March 2023
11	Gudhipadava	Saturday 22 March 2023
12	Shriram Navami	Thursday 30 March, 2023
13	Mahivir Jayanti	Tuesday 04 April 2023
14	Good Friday	Friday 07 April 2023
15	Dr. Babasaheb Ambedkar Jayanti	Friday 14 April 2023
16	Ramzan Id	Saturday 22 April 2023
17.	Maharashtra Day	Monday 01 May 2023
18.	Buddha Purnima	Friday 05 May 2023

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Time Table 2022-23

Faculty : ARTS

Subject : MARATHI

Period	1	2	3	4	5	6
Day / Time	11:00 to 11:48	11:48 to 12:36	12:36 to 1:24	1:34 to 2:22	2:22 to 3:10	3:10 to 3:58
MON		I(MAR)	II (MLT)	III (MLT)		I (MLT)
TUE	II (MLT)	III (MAR)	I (MLT)			III (MLT)
WED	I (MAR)	III (MLT)			I (MLT)	II (MLT)
THUS			II (MLT)	I (MLT)		III (MLT)
FRI	III (MAR)	III (MLT)	I (MAR)			
SAT		I (MAR)	II (MLT)		I (MLT)	

Allotted Workload

Subject : MARATHI & MLT

Year : 2022-23

Sr. No.	Class	No. of periods per week			Paper Allotted
		Lectures	Tutorials	Practical	
1	BA I (A) (MAR) (MLT)	04 05	------	----	
2	BA II MLT	05	-----	----	
3	BA III MAR MLT	04 05	-----	----	
4	NCC	---	----	-----	

Total Workload per week (L+T+P) : 23 (L) = 23 (18 hrs. 24 m)

Teaching Periods Available per month during the session 2022-23

Faculty :ARTS

Subject : MARATHI & MLT

		Odd Semester								Even Semester					
Class	Periods	JUN-22	JUL-22	AUG-22	SEP-22	OCT-22	NOV-22	DEC-22	Total	DEC-22	JAN-23	FUB-23	MAR-23	APR-23	Total
BA I	Theory	10	21	20	21	11	19	06	108	14	22	18	19	20	93
	Tutorial	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B.A. II	Theory	10	22	21	19	11	19	06	108	14	22	18	21		75
	Tutorial	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BA III	Theory	10	22	20	20	11	19	06	108	14	23	18	20		75
	Tutorial	--		--	--	--	--	--	--	--	--	--	--	--	

Teaching Plan for Theory (First Semester)	Class : B A Part I MARATHI	
Sr. No.	Topic to be covered	Lectures Available
	विभाग अ – (वैचारिक)	(30)
01	१)माझे तीन गुरू व तीन दैवते - डॉ.बाबासाहेब आंबेडकर	10
02	२) सत्यशोधक पंढरीनाथ पाटील आणि महात्मा फुले यांचे चरित्र - डॉ.प्रल्हाद जी. लुलेकर	10
03	छत्रपती शिवरायांची प्रशासन व्यवस्था - चंद्रशेखर शिखरे	10
	विभाग ब ललित	(24)
01	जनानी जयपुरी - वसंत बापट	08
02	गढी - प्रतिमा इंगोले	08
03	वाघापूर पॅटर्न - अशोक मानकर	08
01	विभाग क कविता संतवाणी अ)पैलतोगे.... - संत ज्ञानेश्वर ब) कांदा, मुळा भाजी - संत सावता माळी	 03 03
02	नवा शिपाई - केशवसुत	04
03	या भारतात बंधुभाव नित्य वसू दे – राष्ट्रसंत तुकडोजी महाराज	04
04	विमान - अजीम नवाज राही	05
05	पोशींदा - रवींद्र महल्ले	04
06	अतिक्रमण - विशाल इंगोले	05
	विभाग ड उपयोजित मराठी	
01	लेखनविषयक नियम	03
02	मुद्रित शोधन	03

Teaching Plan for Tutorial (First Semester)	Class : B A Part I MLT	
Sr. No.	Topic to be covered	Lectures Available
अ)	अ) कादंबरी लहान	(34)
01	ब) कविता : अर्वाचीन मराठी कविता (संपादित)	64
02	कादंबरी - 'धूळपावले' - लेखक महेंद्र कदम, शब्दालय प्रकाशन, श्रीरामपूर कविता - 'काव्यसरिता' (संपादित) संपादक - डॉ.गजानन जाधव, डॉ.गजानन मंदुे, राघव पब्लिशर्स अन्ड डिस्ट्रीब्युटर्स, नागपूर ('काव्यसरिता' मधील क्रमांक १ ते १० कविता अभ्यासक्रमात राहतील.) कौशल्याधिष्ठीत घटकअभ्यासक्रम	29

04	जीवनाचा शोध घेताना - वाहरू सोनवणे	04
05	खूनच पुसली मानवतेची - सुखदेव ढाणके	04
06	दातासाठी हत्तीला मारण्याचे गणित - लोकनाथ यशवंत	04
	विभाग ड) व्यवहारिक मराठी	(10)
01	**अहवाल लेखन** (संदर्भग्रंथ : उपयोजित मराठीमधील प्रकरण १२ वे	05
02	**प्रसार मध्यमासाठी लेखन वृत्तलेखन** : (संदर्भग्रंथ : उपयोजित मराठीमधील प्रकरण १७ वे मधील बातमी लिहावी कशी हा घटक	05

Teaching Plan for Theory (Five Semester) Class : B A Part III MLT

Sr. No.	Topic to be covered	Lectures Available
01	**अ) मिरासदारी- लेखक- द.मा.मिरासदार**	(55)
	1) नव्यानवबादची एक सफर	03
	2) मुताचा जन्म	03
	3) घडपनारी मुले	03
	4) व्यंकुची शिकवणी	03
	5) शिवाजीचे हस्ताक्षर	03
	6) कोणे एके काळी	03
	7) नदीकाठचा प्रकार	02
	8) शाळेतील समारंभ	03
	९) माझी पहिली चोरी	02
	१०) विरंगुळा	02
	११) निरोप	03
	१२) माझ्या बापाची पेंड	03
	१३) गवत	02
	१४) साक्षीदार	03
	१५) झोप	02
	१६) आजारी पडण्याचा प्रयोग	02
	१७) पाऊस	02
	१८) झाईंग मास्तरांचा तास	02
	१९) स्पर्श	02
	२०) पंचनामा	03
	२१) बाबू शेलाराचे धाडस	02
	२२) चोरी : एक प्रकार	02
02	**ब) साहित्य विचार- संपादक - डॉ. दत्ताजय पुंडे, डॉ. स्नेहल तावरे**	(38)
	अ) प्रकरण १ - साहित्याचे स्वरूप	(13)
	1) शास्त्रीय वाङ्मय आणि साहित्य	02
	2) साहित्यातुन व्यक्त होणार्या अनुभवाचे विशेष	02
	3) वास्तव आणि कल्पित	02
	4) साहित्यातील संवेदनात्मकता	02

	5) साहित्यातील भावनात्मकता	01
	6) साहित्यातील वैचारीकता, ... सेन्द्रीयत्व	02
	7) अनुभवाची विशीष्टता आणि विश्वास्मकता	01
	8) समारोप	01
	ब) प्रकरण २- साहित्याचे प्रयोजन	(12)
	1) प्रयोजन म्हणजे काय?	02
	2) इतर विद्या शाखा व साहित्य	02
	3) प्रयोजन व परिणाम	02
	4) लेखकाच्या दृष्टीकोनातुय प्रयोजन	02
	5) उपदेश करणे व बोध देणे	02
	6) प्रचार करणे	01
	7) आनंद देणे इत्यादी.	01
	क) प्रकरण ३- साहित्याची निर्मितीप्रक्रिया	(13)
	1) प्रास्ताविक	02
	2) प्रतिभा	02
	3) कल्पना शक्ती	02
	4) स्मृती	01
	5) चम्त्कृतिशक्ती	01
	6) प्रतिभा व्यापार व स्वप्नव्यापार	02
	7) अनुभव समृद्धी आणि विद्वता	01
	8) साहित्याकाचे व्यक्तिव आणि त्याचा दृशिकोन	01
	९) साहित्याकाचे संवेदनशीलता...शैलवृती	01

Teaching Plan for Tutorial (Second Semester) Class : B A Part I MARATHI

Sr. No.	Topic to be covered	Lectures Available
	वैचारिक	(29)
1	हा विद्येचा समय आहे ! - शाहू महाराज	11
2	राष्ट्रसंत व राष्ट्रपिता - राम शेवाळकर	09
3	शिक्षणाबिगर माणूस धोंडाच - संतोष भीमराव अरसोड	09
	ललित	(18)
1	1) जागल - भाऊ मांडवकर	02
2	2) हिरवा तपस्वी - शं.ना.नवरे	08
3	3) कस्तुरी - विजय जाधव	08
	कविता	(17)
1	संतवाणी	02
2	अ) दादला (भारूड) -संत एकनाथ	02
3	ब) सदासर्वकाळ अंतरीकुटिल -संत तुकाराम	03

4	रांगूई - मीराताई ठाकरे	03
5	बाप वावरं पेरते - श्याम ठक	02
6	या शहरी संवेदनेशी जुळवून घेताना - अशोक इंगळे	02
	मैफल - किशोर बळी	
1	भगतसिंह - वैभव भिवरकर	04
2	उपयोजित मराठी	04
	कार्यलयीन पत्रव्यवहार	02
	स्व-परिचयपत्र व नोकरीसाठी अर्जलेखन	02

Teaching Plan for Theory (Second Semester) Class : B A Part I MLT

Sr. No.	Topic to be covered	Lectures Available
	कादंबरी - 'धूळपावलं' - लेखक महेंद्र कदम, शब्दालय प्रकाशन, श्रीरामपूर	(34)
	कविता - 'काव्यसरिता'	(39)
अ)	कादंबरी - 'धूळपावलं' - लेखक महेंद्र कदम, शब्दालय प्रकाशन, श्रीरामपूर	34
ब)	कविता - 'काव्यसरिता' (संपादित) संपादक - डॉ.गजानन जाधव, डॉ.गजानन मंदे, राघव पब्लिशर्स अन्ड डिस्ट्रीब्युटर्स, नागपूर ('काव्यसरिता' मधील क्रमांक १ ते १० कविता अभ्यासक्रमात राहतील.) कौशल्याधिष्ठीत घटकअभ्यासक्रम	39

Teaching Plan for Tutorial (Fourth Semester) Class : B A Part II MLT

Sr. No.	Topic to be covered	Lectures Available
01	अ) आत्मकथन- आठवणीचे पक्षी लेखक प्र. ई. सोनकांबळे	(44)
02	ब) लीळाचरित्रातील निवडक कथा- संपादक- राजेंद्र राऊत	(30)
	अ)आत्मकथन- आठवणीचे पक्षी	
	1) प्रास्ताविक	05
	2) दलित साहित्याचा संक्षिप्त इतिहास	06
	3) दलित स्वकथना ची वहिवाट	05
	4) आत्मकथनाची कथा	12
	5) कथना तील मुख्य पात्र	09
	6) कथनाचे वांग्मयीन मूल्यमापन	05
	7) समारोप	02

	ब) लीळाचरित्रातील निवडक कथा	
	1) प्रास्ताविक	04
	2) महानुभाव यांचे साहित्य	03
	3) लीळाचरित्र च्या निमिताने	04
	4) लीळाचरित्रातील कथाकथन	09
	5) लीळाचरित्र च्या आधारे चक्रधरांचे व्यक्तित्व	03
	6) लीळाचरित्राचा मुख्य विषय (चक्रधर स्वामी)	02
	7) सामाजिक व वांग्मयीन मूल्यमापन	03
	8) समारोप	02

Teaching Plan for Theory (Sixth Semester) Class : B A Part III MARATHI

Sr. No.	Topic to be covered	Lectures Available
	विभाग अ) वैचारिक	(30)
01	1) डॉ. पंजाबराव देशमुख - - डॉ. वी. भी. कोलते	10
02	2)राजर्षी शाहू: वसा आणि वारसा – गोविंद पानसरे	09
03	3)स्वराज्य सकल्पिका राष्ट्रमाता जिजाऊ – अशोक राणा	11
	विभाग ब) ललित	(21)
01	1)मरणाहून आपेश वोखटे – माऊसाहेबांची बखर	06
02	2)अरणी – मारुती चितमपल्ली	08
03	3)ढग – सखा कलाल	07
	विभाग क) कविता	(17)
01	1) पोरसवदा होतीस – बा.सी. मर्ढेकर	04
02	2) विझता विझता स्वतःला – नारायण सुर्वे	04
03	3) बैलाचा मृत्यू – वसंत आ. डहाके	03
04	4) काय कराल? - ना. कृ. कवठेकर	03
05	5) शेतकरी – बबन सराडकर	03
	विभाग ड) व्यवहारिक मराठी	(04)
01	**1) जाहिरात निवेदन** - संदर्भ ग्रंथ : उपयोजित मराठी मधील प्रकरण 6 वे	02
02	**2) जाहिरात लेखन** - संदर्भ ग्रंथ: उपयोजित मराठी मधील प्रकरण 8 वे	02

PROGRAMS SCHEDULE (2022-23)

Sr. No.	Particulars	To be organized in
01	प्रवेशित विद्यार्थ्यांचे स्वागत	सप्टे २०२२
02	गांधी जयंती	२ ऑक्टो २०२२
03	अब्दुल कलाम जयंती/वाचन प्रेरणा दिन आभासी पद्धतीने साजरा	१५ ऑक्टो २०२२
04	मराठी अभ्यास मंडळाचे उदघाटन	जाने २०२३
05	लेखन कौशल्यबद्दल आभासी मार्गदर्शन	जाने २०२३
06	आभासी वाचन सराव कौशल्य	फेब्रु २०२३
07	आभासी साक्षात्कार	फेब्रु २०२३
08	मुलाखत कौशल्य मार्गदर्शन	एप्रिल २०२३
09	आभासी काव्य वाचन	मे २०२३
11	अभ्यासक्रम सिंव्हावलोकन	जून २०२३
12	आभासी विद्यापीठ परीक्षा मार्गदर्शन	जुलै २०२३

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Warvat Bakal Dist.Buldana

Departmental CIE Reports
2022-23

ARTS AND COMMERCE COLLEGE

Warwat Bakal Dist- Buldana

Department of English

Continuous Internal Evaluation Report 2022-23

The department of English conducted various online activities for Continuous Internal Evaluation using Whats App, Google Forms, Zoom Meeting, Google Class Room.

Sr. No.	Activity	Particulars	Remarks
1.	MCQ Test	Multiple Choice Questions were given on textual topics	The record is available in the department
2.	Assignments	Assignments were given on Whats App and Google Classroom	
3.	Questionnaire Session	Questionnaire sessions were organized on Zoom Meetings	
4.	Seminar	Seminars were organized on Zoom Meeting	

The above practices were used to assess students' progress as well as to find out Slow and Advanced learners. The advanced learners were motivated to use the different reference books and were given the due hints to avail online resources. Similarly, slow learners were encouraged to learn the basic concepts of the subject like Sentence Construction, Verb Forms, and Spelling etc.

Mr. NishigandhSatav
Head, Department of English

Arts & Commerce College ★ Warvat Bakal ★

Principal
Arts & Commerce College,
Warvat Bakal Dist.Buldana

ARTS AND COMMERCE COLLEGE

Warwat Bakal Dist- Buldana

Department of Economics

Continuous Internal Evaluation Report 2022-23

The department of Economics conducted various online activities for Continuous Internal Evaluation using WhatsApp, Google Forms, Zoom Meeting, Google Class Room.

Sr. No.	Activity	Particulars	Remarks
1.	MCQ Test	Multiple Choice Questions were given on textual topics	The record is available in the department
2.	Assignments	Assignments were given on Whats App and Google Classroom	
3.	Questionnaire Session	Questionnaire sessions were organized on Zoom Meetings	
4.	Seminar	Seminars were organized on Zoom Meeting	

The above practices were used to assess students' progress as well as to find out Slow and Advanced learners. The advanced learners were motivated to use the different reference books and were given the due hints to avail online resources. Similarly, slow learners were encouraged to learn the basic concepts of the subject.

Dr.SubhashGurjar
Head, Department of Economics

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Principal
Arts & Commerce College,
Warwat Bakal Dist.Buldana

ARTS AND COMMERCE COLLEGE

Warwat Bakal Dist- Buldana

Department of Political Science

Continuous Internal Evaluation Report 2022-23

The department of Political Science conducted various online activities for Continuous Internal Evaluation using Whats App, Google Forms, Zoom Meeting, Google Class Room.

Sr. No.	Activity	Particulars	Remarks
1.	MCQ Test	Multiple Choice Questions were given on textual topics Unit on Google Classroom	The record is available in the department
2.	Assignments	Assignments were given on Whats App	
3.	Questionnaire Session	Questionnaire sessions were organized on Google Classroom	
4.	Seminar and PPT Presentation	Seminars were organized on Zoom Meeting	

The above practices were used to assess students' progress as well as to find out Slow and Advanced learners. The advanced learners were motivated to use the different reference books and were given the due hints to avail online resources. Similarly, slow learners were encouraged to learn the basic concepts of the subject.

DrRajendraKorde
Head, Department of Political Science

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Principal
Arts & Commerce College,
Warvat Bakal Dist.Buldana

ARTS AND COMMERCE COLLEGE

Warwat Bakal Dist- Buldana

Department of History

Continuous Internal Evaluation Report 2022-23

The department of History conducted various online activities for Continuous Internal Evaluation using Whats App, Google Forms, Zoom Meeting, Google Class Room.

Sr. No.	Activity	Particulars	Remarks
1.	MCQ Test	Multiple Choice Questions were given on textual topics	The record is available in the department
2.	Assignments	Assignments were given on Whats App and Google Classroom	
3	Viva	Online viva was conducted on curriculum using zoom meeting.	

The above practices were used to assess students' progress as well as to find out Slow and Advanced learners. The advanced learners were motivated to use the different reference books and were given the due hints to avail online resources. Similarly, slow learners were encouraged to read the basic historical articles, newspaper and textbooks of school curriculum.

Dr. SubhashPawar
Head, Department of History

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Principal
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Warwat Bakal Dist- Buldana

Department of Commerce

Continuous Internal Evaluation Report 2022-23

The department of Commerce conducted various online activities for Continuous Internal Evaluation using Whats App, Google Forms, Zoom Meeting, Google Class Room.

Sr. No.	Activity	Particulars	Remarks
1.	MCQ Test	Multiple Choice Questions were given on textual topics	The record is available in the department
2.	Assignments	Assignments were given on Whats App and Google Classroom	
3.	Questionnaire Session	Questionnaire sessions were organized on Zoom Meetings	
4.	Seminar	Seminars were organized on Zoom Meeting	

The above practices were used to assess students' progress as well as to find out Slow and Advanced learners. The advanced learners were motivated to use the different reference books and were given the due hints to avail online resources. Similarly, slow learners were encouraged to learn the basic concepts of the subject like meaning, definition, Advantages and objectives etc.

Dr. SatishRane
Head, Department of Commerce

Arts & Commerce College Warwat Bakal

Principal
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Warvat Bakal Dist.Buldana

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Warwat Bakal Dist- Buldana

Department of Chemistry

Continuous Internal Evaluation Report 2022-23

The department of Chemistry conducted various online activities for Continuous Internal Evaluation using What's App, Google Forms, Zoom Meeting, Google Class Room.

Sr. No.	Activity	Particulars	Remarks
1.	MCQ Test	Multiple Choice Questions were given on textual topics	The record is available in the department
2.	Assignments	Assignments were given on What's App.	
3.	Questionnaire Session	Questionnaire sessions were organized on Zoom Meetings	
4.	Lecture videos	Various online videos of subject provided on What's app.	

The above practices were used to assess students' progress as well as to find out Slow and Advanced learners. The advanced learners were motivated to use the different reference books and were given the due hints to avail online resources. Similarly, slow learners were encouraged to learn the basic concepts of the subject also students were encouraged to study fundamental concepts of chemistry.

Mr. Nityanand D. Dahake
Head, Department of Chemistry

Arts & Commerce College Warvat Bakal

Principal
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ARTS AND COMMERCE COLLEGE

Warwat Bakal Dist- Buldana

Department of Botany

Continuous Internal Evaluation Report 2022-23

The department of Botany conducted various online activities for Continuous Internal Evaluation using Whats App, Google Forms, Zoom Meeting, Google Class Room.

Sr. No.	Activity	Particulars	Remarks
1.	MCQ Test	Multiple Choice Questions were given on textual topics	The record is available in the department
2.	Assignments	Assignments were given on Whats App and Google Classroom	
3	Seminar	Seminars were organized on Zoom Meeting	

The above practices were used to assess students' progress. Students were continuously evaluated by conducting group discussion sessions frequently.

Mr. Santosh Mhasal
Head, Department of Botany

Arts & Commerce College Warvat Bakal

Principal
Arts & Commerce College,
Warvat Bakal Dist.Buldana

ARTS AND COMMERCE COLLEGE

Warwat Bakal Dist- Buldana

Department of Zoology

Continuous Internal Evaluation Report 2022-23

The internal assessment of students was done as per the instructions given in the syllabus by the university. The department of Zoology conducted various online activities for Continuous Internal Evaluation using What's App, Google Forms, Zoom Meeting, Google Class Room.

Sr. No.	Activity	Particulars	Remarks
1.	MCQ Test	Multiple Choice Questions were given on textual topics in google form and Testmoz	The record is available in the department.
2.	Assignments	Assignments were given on What's App and Google Classroom	
3.	Project	Project were given and submitted on what's App	
4.	Seminars and Group discussions	Seminars and Group discussions were carried out on Zoom Platform and Google Classroom.	

The above practices were used to assess students' progress as well as to find out Slow and Advanced learners. The advanced learners were motivated to use the different reference books and were given the due hints to avail online resources. Similarly, slow learners were encouraged to learn fundamental concept of the subject, special attention were given by the faculties to the slow learners.

Dr. Megha R. Solanke
Head, Department of Zoology

Arts & Commerce College Warvat Bakal

Principal
Arts & Commerce College,
Warvat Bakal Dist.Buldana

Cross Cutting Issus (Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum)

Sr. No	Course Name	Reflected Issue
1	B.A, B.com, B.sc (Environmental Studies)	Environment and Sustainability
2	B.Com Company Law	Professional Ethics
3	Botany	Environment and Sustainability
4	Zoology	Environment and Sustainability
5	Economics	Environment and Sustainability
6	Chemistry	Environment and Sustainability
7	History	Gender, Human Values,
8	Political Science	Gender, Human Values,
9	English	Human Values
10	Marathi	Human Values

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The cross-cutting issues - Professional Ethics, Gender, Human Values, Environment and Sustainability reflected in the Curriculum.

Environmental Studies

%SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
ORDINANCE NO. 42 OF 2005

Examination in Environmental Studies leading to Bachelor Degree, Ordinance, 2005

Whereas it is expedient to frame an Ordinance relating to Examination in Environmental Studies leading to Bachelor Degree level, hereinafter appearing, the Management Council is hereby pleased to make the following Ordinance.

1. This Ordinance may be called "Examination in Environmental Studies leading to Bachelor Degree, Ordinance, 2005."
2. This Ordinance shall come into force from the Academic session 2005-06.
3. In this Ordinance and in other ordinances relating to the examination, unless there is anything repugnant in the subject or context :-
   (i) "Academic session" means a session commencing on such date and ending with such date of the year following as may be appointed by the Management Council.
   (ii) "Admission to an examination" means the issuance of an admission card to a candidate in token of his having complied with all the conditions laid down in the relevant ordinance, by a competent officer of the University.
   (iii) "Applicant" means a person who has submitted an application to the University in the form prescribed for admission to an examination.
   (iv) "Candidate" means a person who has been admitted to an examination by the University.
   (v) "Regular Candidate" means an applicant who has applied for admission to a University examination through an affiliated college, Department or Institute in which he/she has prosecuting a regular course of study.
   (vi) "Examinee" means a person who present himself/herself for an examination to which he/she has been admitted.
   (vii) "Examination" means an examination prescribed by the University under the relevant Ordinance.

   (viii) An "Ex-student" is a person who having once been admitted to an examination of this University, is again required to take the same examination by reason of his failure or absence thereat and shall include a student who may have joined a college, Department or Institute again in the same class.
   (ix) "Bachelor Degree Examination" means a examination leading to Bachelor Degree of the University.
   (x) "Previous Year" means a year following by final year of Bachelor Degree.
4. Save as otherwise specifically provided, the conditions prescribed for admission to the examination under this Ordinance shall apply to all persons who wish to take the examination to the Degrees of the University mentioned in para 5 below.
5. The conditions prescribed for admission to examination under this Ordinance shall apply to following degrees of the University :-
   1) Bachelor of Arts
   2) Bachelor of Performing Arts
   3) Bachelor of Fine Arts
   4) Bachelor of Mass Communication
   5) Bachelor of Social Work
   6) Bachelor of Commerce
   7) Bachelor of Business Administration
   8) Bachelor of Science
   9) Bachelor of Computer Science
   10) Bachelor of Computer Applications
   11) Bachelor of Pharmacy
   12) Bachelor of Science (Home Science)
   13) Bachelor of Technology (Cosmetics)
   14) Bachelor of Engineering

6 i) Environmental Studies shall be a compulsory subject for a previous year examination of the following Bachelor Degrees of the University,

1) Bachelor of Arts

2) Bachelor of Performing Arts

3) Bachelor of Fine Arts

4) Bachelor of Mass Communication

5) Bachelor of Social Work

6) Bachelor of Commerce

7) Bachelor of Business Administration

8) Bachelor of Science

9) Bachelor of Computer Science

10) Bachelor of Computer Applications

11) Bachelor of Pharmacy

12) Bachelor of Science (Home Science)

13) Bachelor of Technology (Cosmetics)

14) Bachelor of Engineering (Part Time) (Civil)

ii) Environmental Studies shall be a compulsory subject for IIIrd & IVth Semester of the following Bachelor Degrees of the University,

1) Bachelor of Engineering

2) Bachelor of Textile

3) Bachelor of Technology (Chemical Technology)

4) Bachelor of Technology (Chemical Engineering)

5) Bachelor of Architecture, and

iii) Environmental Studies shall be a compulsory subject for Vth & VIth Semester of the Degree of Bachelor of Laws (Five Year Course)

iv) Students admitted to Second Year/Third Year IVth Semester VIth Semester of various degree examination courses in different faculties in the academic

8. Scope of the subject for annual pattern examination and or semester pattern examination shall be as provided under the syllabus.

9. Common question paper for all courses covered under this Ordinance alongwith answer books shall be supplied by the University to the Colleges, Departments and Institutes for conducting the examination of the subject.

10. Valuation of the answer books relating to this subject shall be done at College/Department/Institution level only. Remuneration for valuation of answer books shall not be paid by the University.
Provided that prescribed evaluation fee for evaluation of each answer Book/s of an external examinee/s appeared from the examination centre shall be paid to each examination centre.

11. It shall be obligatory on the part of the College/Department/Institute to submit candidate wise following information to the University on or before the date as may be prescribed by the University :-

Sr.No.	Grade/Category	Marks secured
1.	"A"	- 60 and above
2.	"B"	- 45 to 59
3.	"C"	- 35 to 44
4.	"D"	- 25 to 34
5.	"Fail"	- 24 and below
6.	"Absent"	

12. For the purposes of teaching, learing and examination, the Committee consisting of three teachers shall be appointed by the Principal/ Head of the Department/Head of the Institution under his/her Chairmanship/ Chairpersonship. While appointing three teachers on the said committee, the Principal shall take care that the teachers to be appointed on the committee, if necessary, shall be from different faculty.

27. ENVIRONMENTAL STUDIES

Total Marks : 100

PART-A

SHORT ANSWER PATTERN **25 Marks**

1. The Multidisciplinary nature of environmental studies

- Definition, scope and importance.
- Need for public awareness.

(2 lecture hours)

2. Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental lesislation.
- Public awareness.

(7 lecture hours)

3. Human Population and the Environment

- Population growth, variation among nations.
- Population explosion - Family Welfare Programme.
- Environment and human health.
- Human Rights.
- Value Education.
- HIV / AIDS.
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.

Case Studies (6 lecture hours)

PART-B

ESSAY TYPE WITH IN-BUILT CHOICE — 50 Marks

4. Natural resources :

- Renewable and non-renewable resources :
  - Natural resources and associated problems.
    - Forest resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
    - Water resources : Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
    - Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
    - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer - pesticide problems, water logging, salinity, case studies.
    - Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
    - Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
  - Role of an individual in conservation of natural resources.
  - Equitable use of resources for sustainable lifestyles.

(8 lecture hours)

5. Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem :-
  - Forest ecosystem
  - Grassland ecosystem

6. Biodiversity and its conservation

- Introduction - Definition: genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

(8 lecture hours)

7. Environmental Pollution

- Definition
- Causes, effects and control measures of :-
  - Air pollution
  - Water pollution
  - Soil pollution
  - Marine pollution
  - Noise pollution
  - Thermal pollution
  - Nuclear hazards
- Solid Waste Management : Causes, effects and control measures of
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management : floods, earthquake, cyclone and landslides.

(8 lecture hours)

PART-C

ESSAY ON FIELD WORK — 25 Marks

8. Field work

- Visit to a local area to document environmental assets - river / forest / grass land / hill / mountain
- Visit to a local polluted site - Urban / Rural / Industrial / Agricultural

Company Law

Appendix - Z

B.Com. III
Semester - VI
COMPANY LAW

Time : 3 Hours

Marks: 0 Theory

Unit I – Introduction

1.1 – Introduction; definition, silent features of company, Act 2013
1.2 – Formation of company, stages of formation
1.3 - Promoters, Functions of promoter,Duties and liabilities of promoter,
1.4 -Types of company,

Unit II – Incorporation of company

2.1– Incorporation of company
2.2 – Prospectus of company
2.3– MOA of company
2.4– Article of company

Unit III – Share capital of company

3.1 – Share capital of company, Types of share and debenture
3.2 – Issue of shares, Allotment, calls and forfeiture share
3.3 – Transfer & transmission of share
3.4-Share certificate and share warrant

UNIT IV - SECURITIES MARKET:

.1- Brief history of Stock Exchange, Study of functions of BSE and NSE
4.2- Stock Exchanges and its importance.
4.3 - Primary Market and Secondary Market: Components of Primary Markets
4.4 - D-Mat Account: Definitionand Procedure.

UNIT – V COMPANY SECRETARY AND COMPANY MEETINGS:

5.1 - Appointment, Duties and Responsibilities of Company secretary
5.2– Types of company meeting: Annual and General meeting of company, Statutory meeting of Company, – Extraordinary meeting
5.3 – Notice of meeting & Agenda of meeting, proceedings of meeting.
5.4 - Voting methods of meeting and quorum. Minutes proceedingof meetings,its contents

Reference books:

1. Company Law (volume-I) Rakesh Bhargava: Taxmann 's, New Delhi.
2. Company Act-2013: Ravi Puliani, Mahesh Puliani, Bharat Law House Pvt. LTD., New Delhi.
3. Principles of Company Law: M.C. Shukla, S.S. Gulshan,S Chand Company LTD., New Delhi.
4. ATax Book of Company Law: P.P. Gogna.Chand & Company, New Delhi.
5. Company Law: Ashok K. Bagrial, Vikas Publishing House Pvt. LTD. Bangalor
6. Indian Company Law: Awartar Singh, Sultan Chand & Sons, New Delhi
7. Guide to Company Law: Procedures, M.C. Bhandari,Wadhwa & Company, Nagpur
8. Company Law: H.K Saharaya, Universal Law Publishing Co., New Delhi
9. कंपनी कायदा: किरण चंद नेरकर ,होते, वझाठाकरे आण सी एस कांबले, साई योत पब्लिकेशन , नागपूर
10. कंपनी विधि: डॉ. आर. एल. नौलखा. नौलखा, रमेश बुक डेपो, जयपुर
11. कंपनी अधिनयम व अंकेक्षण: डॉ. डी.पी. जैन, डॉ. आर.एम.एस. मलक,धनपतराय पब्लिकेशन कंपनी , नई दिल्ली
12. कंपनी सचिवाची कार्यपद्धती: ए. एस. उखडकर.

Economics

*****

B.A. Final
Semester-V
Indian Economy
(To be Implemented from 2019-2020 Session)

Credit : 04

Marks : 80
Int.Ass. : 20

Unit-I Indian Economy and Planning :

1.1 Basic Feature of Indian Economy

1.2 Economic Planning : Objectives, Types, Objective of 11th & 12th Five Year Plan.

1.3 New Economic Reforms :- Liberalization, Privatization, Globalization

Unit-II Agriculture :

2.1. Importance of Agriculture in Indian Economy :

2.2 Productivity :- Causes of Low Productivity and Remedies to increase productivity

2.3 Agricultural Marketing : Difficulties and Remedies of Agricultural Marketing

2.4 Subdivision and Fragmentation : Concept, Causes & Remedies.

Unit-III Industrial :

Unit-II Agriculture :

2.1. Importance of Agriculture in Indian Economy :

2.2 Productivity :- Causes of Low Productivity and Remedies to increase productivity

2.3 Agricultural Marketing : Difficulties and Remedies of Agricultural Marketing

2.4 Subdivision and Fragmentation : Concept, Causes & Remedies.

Unit-III Industrial :

3.1 Industrial Policy - 1991

3.2 Small Scale Industry : Importance, Problem, Remedies

3.3 Industrial Disputes : Causes, Remedies

3.4 Trade Union : Characteristics and Functions

Unit – IV External Sector an Important Areas of Concern :

4.1 India's Foreign Trade :- Direction & Composition

4.2 Poverty :- Causes, Remedies

4.3 Unemployment : Causes, Types, Remedies

4.4 Self Help Group

Unit-V Environment and Pollution :

5.1 Environment : Meaning and Types

5.2 Natural Resources : Land, water, Forest, Causes and Remedies of Air, Water and Land Pollution

5.3 Global Warming.

Books Recommended :

1) Rudra Datta & K.P.M. Sundaram Indian Economy, S. Chand & company New Delhi

2) Five Year Plan, Govt. of India

3) Jalan Bimal :- Indian Economic Policy, preparing for the 21st Century, Viking, New Delhi

4) डॉ. ग.ना. झामरे : भारतीय अर्थव्यवस्था व विकास व पर्यावरण, अर्थशास्त्र, पिंपळापुरे प्रकाशन, नागपूर

5) मिश्र पुरी : भारतीय अर्थव्यवस्था, हिमालय पब्लिकेशन, दिल्ली

Political Science

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Appendix-H

Syllabi for B.A. Final
Semester-V
Modern Concepts and Policy in Politics
(Implemented From 2019-2020 Session)

Marks : Theory – 80
In.Ass - 20

Unit-I Leadership :

a) Meaning of Leadership.
b) Factors of Leadership.
c) Role of Leadership

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Unit-II Reservation :

a) Meaning and Nature of Indian – Reservation Policy.
b) Reservation in Indian Parliament.
c) Reservation and Politics in India.

Unit-III Nationalism :

a) Meaning and Nature of Nationalism.
b) Factors of Nationalism
c) Present Status of Indian Nationalism.

Unit-IV Communalism :

a) Meaning of Communalism.
b) Role of Communalism in Indian Politics.
c) Present Status of Communalism in India.

Unit-V Terrorism :

a) Meaning and Definition of Terrorism.
b) Kinds of Terrorism
c) The Acts for Prevention of Terrorism in India.

Internal Assessment of Marks (20 Marks)

1) Group Discussion Related to Syllabus — 10 Marks
2) Paper Presentation OR P.P.T Presentation Related to Syllabus — 10 Marks

English

Appendix-A

SYLLABUS
PRESCRIBED FOR
B.A – PART II EXAMINATION
SEMESTER III
COMPULSORY ENGLISH

TIME : 3 HOURS

MAX MARKS THEORY : 80 MARKS
MAX MARKS INTERNAL ASSESSTMENT : 20 MARKS

Prescribed Textbook : Blossoming Flowers by Board of Editors, Puhlished by Orient Blackswan.

UNIT I

PROSE –

1. India's Message to the World – Swami Vivekanand
2. The Pleasure of Ignorance – Robert Lynd
3. The Happy Prince – Oscar Wilde
4. The Three Questions – Leo Tolstoy

UNIT II

POETRY –

5. Sonnet 116 – William Shakespeare
6. Dirge – James Shirley
7. Leisure – W H Davies
8. A Baby Asleep After Pain – D.H Lawrence

UNIT III

GRAMMAR :

9. Clauses :
   - ✓ Main Clause
   - ✓ Subordinate Clause (Noun Clause , Adverb Clause , Adjective Clause)
10. Types of Sentences :
   - ✓ Assertive / Affirmative Sentences
   - ✓ Exclamatory Sentences
   - ✓ Negative Sentences
   - ✓ Interrogative Sentences
   - ✓ Simple Sentences
   - ✓ Compound Sentences
   - ✓ Complex Sentences
   - ✓ Compound Complex Sentences

UNIT IV

COMMUNICATION SKILLS :

11. Telephone Conversation
   - ✓ Answering the Telephone and Asking for Someone
   - ✓ Taking and Leaving Messages
   - ✓ Making Enquiries on the Phone
12. Interpersonal Conversation
   - ✓ Getting People's Attention and Interrupting
   - ✓ Making Requests and Responding to Them
   - ✓ Asking for Directions and Giving Directions

UNIT V

MULTIPLE CHOICE QUESTIONS
Based on prescribed text Unit I & II only

Internal Assessment :

Viva-Voce

A) Personal Interview

B) Seminar – Presentation (Based on prescribed text : Prose & Poetry)

संत गाडगे बाबा अमरावती विद्यापीठ, अमरावती

बी.ए.भाग-२ मराठी वाङ्मय
सत्र ३ रे

।। गुण विभागणी ।।

एकूण गुण – १००
लेखी गुण – ८०
अंतर्गत मूल्यमापन – २०
वेळ - ३ तास

अभ्यासक्रमासाठी नेमलेले ग्रंथ -

१) निवडक मराठी कथा - संपादित
२) संत तुकारामांचे निवडक अभंग - संपादक - आ.ह. साळुंखे, लोकायत प्रकाशन, सातारा.

अ) निवडक मराठी कथा	४८ गुण
ब) संत तुकारामांचे निवडक अभंग	३२ गुण
	८० गुण

प्रश्ननिहाय गुण विभागणी

प्रश्न – १ संदर्भासह स्पष्टीकरण - १६ गुण

- निवडक मराठी कथा यावर प्रत्येकी चार गुणांचे दोन संदर्भ विचारले जातील.
- संत तुकारामांचे निवडक अभंग यावर प्रत्येकी चार गुणांचे दोन संदर्भ विचारले जातील.

प्रश्न – २ निवडक मराठी कथा यावर एक दीर्घोत्तरी प्रश्न विचारला जाईल. - १६ गुण

13. BOTANY

There shall be following paper and practical for B. Sc. Part - I Semester one examination. The syllabus is based on six theory periods and six practical periods per week (Total 75 – 80 theory sessions and 25 practical sessions per complete semester). There shall be one compulsory paper of 3 hours duration, in theory as stated below and practical examination extending for 4 hours. Every examinee shall offer the following paper of 100 marks (out of which 80 marks will be for written examination and 20 marks for internal assessment) and practical examination of 50 marks. Candidates are required to pass separately in theory and practical examination.

1.	Paper – I		Marks
	a. Theory	-	80
	b. Internal Assessment	-	20
2.	Practical	-	50
		Total	**150 Marks**

15 – BOTANY

Diversity & Applications of Microbes and Cryptogams

UNIT-I : Plant Diversity **(15)**

1.1 Cyanobacteria and its impact on origin of life

1.2 Introduction to Plant Kingdom: Cryptogams

1.3 Diversity of plants with respect to habitat, form, nutrition and ecological status

1.4 General Account of Viruses and structure of TMV and HIV

1.5 Bacteria: structure, Nutrition and reproduction

1.6 Role of microbes in Agriculture, Medicine and Industries

UNIT-II: Algae **(15)**

2.1. Classification according to F. E. Fritsch and G. M. Smith up to classes

2.2. General characters of algae with reference to Habitat, Thallus organization, Pigmentation, Reserve food and Reproduction

2.3. General characters of following classes with special reference to examples mentioned -

UNIT-III : Fungi **(15)**

3.1. Classification according to Ainsworth (1973)

3.2. General characteristics of following classes with special reference to examples mentioned –

3.2.1. Mastigomycotina : Albugo (Cystopus)

3.2.2. Ascomycotina : Aspergillus

3.2.3. Basidiomycotina : Puccinia graminis-tritici

3.2.4. Deuteromycotina : General characters

3.3 Lichen-Types & Economic importance

Unit-IV : Bryophyte **(15)**

4.1. Classification according to G. M. Smith

4.2. General characters, thallus organization and life cycle of-

1.2.1. Hepaticopsida - Marchantia

1.2.2. Bryopsida - Funaria

4.3. Evolution of sporophyte in bryophytes

4.4. Affinities of bryophytes with algae and pteridophytes

4.5. Brief Account on some Indian Bryologist.

Unit-V : Pteridophyte **(15)**

5.1. Pteridophytes as First Vascular Plants

5.2. Classification according to G. M. Smith

5.3. General characters of the following classes with special reference to examples mentioned –

5.3.1. Sphenopsida - Equisetum

5.3.2. Filicopsida - Marsilea

5.4. Stele types in pteridophytes

5.5 Heterospory and Seed Habit in Pteridophytes

Unit-VI : Application of Microbes Cryptogams **(15)**

6.1. Economic Importance of Algae with special reference to Food, Industries, Agriculture and Harmful aspects

6.2. Mycorrhiza – Types and Application

6.3. Role of Fungi in Industries, Medicine, Food & Agriculture

6.4. Plant Diseases –

6.4.1. Viral - TMV

7. BOTANY

3S- BOTANY

ANGIOSPERMS SYSTEMATICS, ANATOMY & EMBRYOLOGY

UNIT I: Angiosperm Systematics and Biodiversity.

1.1 Angiosperms: Origin and Evolution **(Pteridospermean and Bennettitalean Theory)**

1.2 Botanical Nomenclature: Principles of rules, Taxonomic Ranks, Type concept, Valid publication.

1.3 Herbarium – Concept & significance, Royal Botanical Garden, Kolkata.

1.4 Concept of biodiversity, Ex situ and In situ conservation

1.5 Concept & importance of Biodiversity.

UNIT II: Angiosperm Systematics

2.1 Systems of Classification: Bentham and Hooker's System, Engler and Prantle's system.

2.2 Systematic studies & economic importance of following Families

Dicotyledons (Polypetalae) : Malvaceae, Brassicaceae, Leguminosae, Apiaceae,

UNIT III: Angiosperm Systematics

3.1 Systematic studies & economic importance of following Families

Dicotyledons (Gamopetalae): Asteraceae, Asclepiadaceae, Apocynaceae, Solanaceae, Verbenaceae, Lamiaceae.

3.2 Dicotyledons (Monochlamydeae): Euphorbiaceae.

3.3 Monocotyledons: Liliaceae, Poaceae.

UNIT IV: Anatomy

4.1 Types of Tissues:

Meristematic - Types of meristems

Permanent - Simple and complex,

4.2 Characteristics of growth rings, Sapwood and heartwood.

4.3 Anatomy of root: Primary structure in dicot and monocot stem, normal secondary growth in dicot stem.

5.2 Anomalies in primary structure in *Boerhaavia* stem, secondary structure in *Bignonia* and *Dracaena* stem.

5.3 Leaf Anatomy: Internal structure in *Nerium* and *Maize* leaf.

UNIT VI : Embryology

5.1 Microsporangium, microsporogenesis, development of male gametophyte.

5.2 Megasporangium, types of ovules, megasporogenesis, development of female gametophyte (monosporic, Bisporic & tetrasporic).

5.3 Double fertilization and triple fusion.

5.4 Embryo - Classification of embryo.

5.5 Endosperm types & significance, Suspensled amination

LABORATORY EXERCISES

1) Embryology of Angiosperms:
   - i) Observation of wide range of flowers available in the locality and methods of their pollination.
   - ii) Study through permanent slides of T.S. of anthers, microsporogenesis, L.S. of ovule, types of endosperms and embryo of Capsella.
   - iii) Mounting of T.S. of anthers, Pollen grains and pollinia.
2) Anatomy of angiosperms : Preparation of double stained slides of root, stem and leaves of angiosperms mentioned in the syllabus.
3) Taxonomy : Description of ten plants belonging to different families in technical language and identification upto family level.
4) Long and short excursion is essential

Note : Field tour reports should be supported by exhaustive field notes and photographic representation of plant species studied

Brassicaceae- *Brassica*, **Malvaceae-** *Hibiscus, Sida, Malvastrum*, **Fabaceae-** *Crotalaria, Indigifera, Tephrosia*, **Caesalpinoidae-** *Caesalpinia, Cassia*, **Mimosoidae-** *Prosopis, Acacia*, **Apiaceae-** *Coriandrum*,

Apocynaceae- *Vinca, Thevetia*, **Asclepiadaceae-**

13. Purohit, S.N. (1987) Principles and Applications of Photogeology , Wiley Eastern Limited.
14. Sabins, F.F. (2000) Remote Sensing Principles and Interpretation, W.H. Freeman and Company, USA.
15. Lillesand, T.M. and Kiefer, R.W. (2000) Remote Sensing and Image Interpretation, John Wiley and Sons Inc., New York.
16. Drury, S.A. (1987) Image Interpretation in Geology, Chapman and Hall, London.
17. Todd, D.K. (1980) Ground Water Hydrology John Wiley and Sons Inc. New York.
18. Karanth, K.R. (1989) Hydrogeology. Tata McGraw Hill Pub. Co.Ltd., New Delhi.
19. Nagabhushanaiah, H.S. (2011) Groundwater in Hydrosphere (Groundwater Hydrology) CBS Publishers, New Delhi.
20. Karanth K.R. Groundwater Assessment, Development and Management, Tata McGraw Hill Pub. Co. Ltd., New Delhi.
21. Raghunath : Ground Water Hydrology) New Age Publication, Pune

project has been divided into 6 parts. There shall be one question in every unit with internal choice for each of 12 marks & one compulsory question covering all the syllabus of Semester-V (8 marks).

5b - BOTANY

PLANT PHYSIOLOGY AND ECOLOGY

Unit – I: Plant Water Relations

1.1 Importance of water to plant life.
Imbibition , Diffusion, Osmosis, Plasmolysis.
1.2 Active and passive Absorption of water.
1.3 Ascent of sap – Root Pressure and Transpiration Pull Theory.
1.4 Transpiration - Types of transpiration, Stomatal mechanism, Mechanism of transpiration (Starch Sugar hypothesis), Significance, Antitranspirants, Guttation.
1.5 Mineral uptake - Active uptake – Carrier Concept, Passive uptake - Ion Exchange.

Unit – II: Metabolism:

2.1 Photosynthesis - Introduction, Role of Light, Photosynthetic Apparatus and Pigments, Two Pigment System, Photophosphorylation, C3 and C4 cycle, CAM Pathway.
2.2 Respiration - Introduction, Mitochondria as a Respiratory source, Types of Respiration - Aerobic and Anaerobic, Mechanism of aerobic respiration: Glycolysis, Kreb cycle, Electron transport system and Chemiosmotic ATP generation, Respiratory Quotient.

Unit - III: Metabolism and growth

3.1 Nitrogen Metabolism- Sources of nitrogen, Symbiotic nitrogen fixation, Role of Nitrate reductase.
3.2 Growth - Phases of growth, Growth curve, Physiological role of growth hormones (Auxins, Gibberellins, Cytokinins, Abscisic acid, and Ethylene).
3.3 Physiology of Senescence and Abscission.

Unit – IV: Plant responses

4.1 Photoperiodism - Concept of Florigen, Role of Phytochrome,
4.2 Vernalization- Concept and Significance.
4.3 Plant movement- Tropic (Phototropic and Geotropic) and Nastic (Epinasty, Hyponasty and Seismonasty)
4.4 Stress physiology- Concept, Types of stress, Water and Salinity stress.

Unit – V: Ecology and Environment:

5.1 Concept of environment, Concept and scope of ecology.
5.2 Ecological factors- Climatic- Light, Temperature and Water.
5.3 Atmosphere and its composition.
5.4 Edaphic factor- Process of soil formation, soil profile, soil biota and their role.
5.5 Ecological Adaptations - Morphological and Anatomical adaptation in Hydrophytes, and Xerophytes.

Unit – VI: Ecosystem:

6.1 Population Ecology- Natality and Mortality, Community characteristics - Frequency, Density and Abundance
6.2 Ecological Succession - Hydrosere and Xerosere
6.3 Ecosystem - Definition, Structure and Function,

Food chain, Food web, Energy flow model (Single channel model)
6.4 Types of Ecosystem- Pond ecosystem, Desert ecosystem.

LABORATORY EXERCISE :

Plant Physiology: Major experiment (Any Seven)

1. To study the effect of temperature and organic solvent on permeability of plasma membrane.
2. To study osmotic pressure of cell sap by plasmolytic method.
3. To determine water potential of plant tissue.
4. To determine the path of water (ascent of sap)
5. To determine the rate of transpiration by Ganongs photometer.
6. To determine rate of photosynthesis under varying quality of light and CO2 concentration.
7. To study the rate of photosynthesis in terrestrial plants with the help of Ganongs Photosynthometer.
8. Separation of chloroplast pigments by paper chromatography/ solvent extraction method.
9. Separation of amino acids by paper chromatography method.
10. To determine R.Q. using different substrates.
11. To determine the rate of respiration by Ganongs respirometer.
12. To study antagonism of salts.
13. To study phenomenon of adsorption.
14. To study effect of IAA and Gibberellins on seed germination.
15. Test for secondary metabolites- Alkaloid, Phenolics, Tannin, Flavonoids and Lignin
16. To study Endo and Exo-osmosis by egg membrane osmoscope

Plant Physiology: Minor experiment- (Any Three)

1. To demonstrate fermentation.
2. To demonstrate exo and endosmosis
3. To demonstrate transpiration by Bell jar.
4. To demonstrate light is necessary for photosynthesis.
5. To demonstrate anaerobic respiration in germinating seeds.
6. To demonstrate the evolution of CO2 in respiration.
7. To demonstrate the phenomenon of rastic movement with help of *Mimosa pudica* / or *Biophytum sensitivum*.

Ecology: Major experiment (Any Three)

1. Study of morphological and anatomical adaptations in hydrophytes – *Hydrilla, Eichhornia, Typha, Vallisneria* and *Nymphaea* (any two)

IS-ZOOLOGY

LIFE AND DIVERSITY OF NON-CHORDATA

UNIT-I : 1. Classification of Non-Chordata.

2. Phylum Protozoa: General characters.

3. Type study: Plasmodium vivax: Structure, Life-cycle.

4. Parasitic protozoan and human diseases': Malaria, Amoebiasis, Trypanosomiasis, Leishmaniasis.

UNIT-II: 1. Phylum Porifera: General Characters.

2. Type study: Scypha: Habits and habitat, External features, cell types, spicules & Structure and significances of canal system.

3. Phylum Coelenterata: General Characters,

4. Type study: Metridium: Habits and habitat, External features, Gastro-vascular cavity, Mesenteries, Reproduction.

UNIT-III: 1. Phylum Platyhelminthes: General Characters.

2. Type study: Fasciola hepatica: Habits and habitat, External features, Digestive, Excretory, Reproductive system and Life cycle.

3. Phylum Aschelminthes: General Characters.

4. Type study: Ascaris lumbricoides: Habits and habitat, External features, Digestive, Excretory, Reproductive system and Life cycle.

UNIT-IV: 1. Phylum Annelida: General Characters.

2. Type study: Leech: External features, Digestive, Excretory and Reproductive system.

3. Phylum Arthropoda: General Characters

4. Type study: Cockroach: Habits and habitat, External features, Digestive system, Respiratory system, Reproductive system.

UNIT-V : 1. Phylum Mollusca: General Characters.

2. Type study: Pila globosa: Habits and habitat, External features (Shell and Body), Digestive, Respiratory and Reproductive

physiological

4. Larval forms and their significance: Amphiblastula, Planula, Trochophore, Bipinnaria, Brachiolaria,

LIFE AND DIVERSITY OF NON-CHORDATA

Practical : Two practical per week each of 3 period's duration. The Examination shall be of 4 hrs duration and of 50 marks.

I-Life and diversity of non-chordata

1. Observation, Classification up to classes and sketching of the following animals, (Specimens or Models):
   - Phylum Protozoa: *Plasmodium* trophozoite, *Euglena*, *Entamoeba histolytica*.
   - Phylum Porifera: Sycon, Bath sponge, *Euplectella*.
   - Phylum Coelenterata: *Obelia*, *Aurelia*, *Tubipora*.
   - Phylum Helminthes: *Taenia*, *Ascaris* (male & female).
   - Phylum Annelida: Nereis, Earthworm, Leech,
   - Phylum Arthropoda: Prawn, *Limulus*, *Aranea*, *Scolopendra*, Ador, Moth, Mosquito.
   - Phylum Mollusca: Chiton, Pila, Dentalium, Unio, Octopus.
   - Phylum Echinodermata: *Antedon*, *Holothuria*, , *Echinus*, Sea star, Brittle star
   - Phylum Hemichordata: *Balanoglossus*
2. Study of Permanent slides:

   L.S Sycon, nematocyst, Ascaris egg, T.S. Ascaris through gonads, T.S Leech through crop, Compound eye of insect, Radula, Gill lamella and Osphradium of Pila, Scolex and Gravid Proglottid of Taenia.
3. Anatomical Study through Computer Aided Techniques, Video Clipping Models, Photographs and other available resources :

   a) Leech/Earthworm: Alimentary canal, Reproductive system, Nervous system,

   b) Cockroach/Cockroach: Digestive system, Nervous system

5. A Handbook of Seed Inspectors : Central Seed Committee Ministry of Agriculture.
6. Indian Minimum Seed Certification Standards : N.S.Tanwar, S.V.Singh.
7. Principles of Seed Certification and Testing : N.P.Nema.

BSc.II Semester III
10.ZOOLOGY

There shall be the following paper and practical for B.Sc. Part-II Semester III examination. The syllabus is based on 6 theory periods and six practical periods per week (Total 75-80 theory sessions and 25 practical sessions during the complete semester). There shall be one compulsory theory paper of 3 hours duration, as stated below and a practical examination extending for four hours. Every examinee shall offer the following paper of 100 marks (80 for written examination and 20 marks for internal assessment) and a practical examination of 50 marks. Candidates are required to pass separately in theory and practical examination.

Semester III

1)	Paper-I: Life and diversity of Chordata and concepts of evolution	Marks Allotted
	Written examination.....	80
	Internal assessment.....	20
2)	Practical:	50
	Total:	**150 Marks**

Paper -3 S-Zoology
LIFE AND DIVERSITY OF CHORDATA AND CONCEPT OF EVOLUTION

Unit I : Phylum Chordata:

Affinities of Agnatha:

Series Pisces:

Type study: *Scoliodon sorrakowah* (Dogfish) - Habits and habitat, External Characters, Digestive system: alimentary canal and digestive glands, Respiratory system: respiratory organ and mechanism of respiration, circulatory System: Structure and working of Heart, major arteries and veins, Lateral line receptors, Migration in fishes-Types, causes and significance.

Unit II : Class Amphibia:

Type Study - *Rana tigerina*, Habits and habitat, external, characters. Respiratory organs- Circulatory system; Structure of Heart, major arteries and veins, urinogenital system.. Parental care in amphibia.

Class Reptilia:

Type study- *Calotes versicolor*- Habits and habitat, External characters, circulatory system- Structure of Heart, major arteries and veins. Urinogenital system, snake venom and anti-venom.

Unit III : Class Aves:

Type study: Pigeon-*Columba livia* Habits and habitat, External characters, Respiratory system,

urinogenital system. Flight adaptations, Migration in birds.

Class Mammalia:

Primitive mammals: salient features of Prototheria and Metatheria, Morphology of mammalian endocrine glands.

Aquatic mammals.

Unit IV : Evolution: Meaning and scope,

Indirect Evidences of evolution: Evidences of organic evolution- morphological and anatomical, physiological and biochemical, embryological.

9. Electricity and Magnetism Vol. II – Berkley Physics Course
10. Electricity and Magnetism – D.N.Vasudeva
11. Electricity and Magnetism – Brijlal & Subramaniam
12. Electrodynamics – S.L.Gupta & R.Singh
13. Electricity & Magnetism – Reitz & Milford
14. Electricity & Magnetism – A.S.Mahajan & A.A.Rangwala (TMH)
15. Principle of electricity & Magnetism – Purcell& Philips
16. Electricity & Magnetism – S.S.Atwood
17. Electromagnetic waves & radiating systems – E.C. Jordan

9. CHEMISTRY

2S Chemistry

Total Lectures: 84 *Marks: 80*

Note: Figures to the right hand side indicate number of lectures.

Unit I 14L

A] Polarisation-Definition, polarising power, polarizability, effect of polarization on nature of bond. Fajan's rules of polarisation and its applications. [4]

B] Covalent bonding-Directional nature of covalent bond. Hybridisation, types of hybridisation to explain geometries of NH_4^+ ion, PCl_5, SF_6 and IF_7. [4]

C] **Acids and Bases**-Theory of solvent systems and Lux-Flood concept of acids and bases. Hard and soft acids and bases. Pearsons HSAB or SHAB principle with important applications. [6]

Unit II 14L

A] **P-Block Elements**-Comparative study of 16th and 17th group elements with reference to electronic configuration, ionization energy and oxidation states. Oxidising properties of halogens with reference to oxidation potential. Interhalogen compounds, structure and bondings. Introduction to fluorocarbons. [6]

B] **Noble Gases**-Inertness of noble gases. Compounds of noble gases-only structure and bonding in XeF_2, XeF_4,XeF_6, XeO_3 and XeO_4 [2]

C] **Nonaqueous Solvents**-Requirements of a good solvent. Water as

Unit III 14L

A] **Alkyl Halides:** Synthesis of vinyl chloride from acetylene and allyl chloride from propylene,Reactions of both with aqueous and alcoholic KOH, Comparison of reactivity of vinyl an allyl chloride. [4]

B] **Aryl Halides:** Synthesis chlorobenzene from benzene, phenol and benzene diazonium chloride, Synthesis of benzyl chloride from toluene and benzyl alcohol, Reactions of both with aqueous KOH, NH_3 and sodium ethoxide, Comparison of reactivity of chlorobenzene and benzyl chloride, Benzyne intermediate mechanism. [4]

C] **Alcohols:** Dihydric alcohols: Ethylene glycol- Preparation from ethylene, ethylene chloride and ethylene oxide, Reactions- with Na, PCl_5, CH_3COOH, $ZnCl_2$ conc. H_2SO4 and dehydration with heat. Trihydric alcohols: Glycerol- Preparation from propylene, Reactions- with Na, HCl, PCl_5, HNO_3 and $KHSO_4$. Pinacol- pinacolone rearrangement (mechanism). [6]

Unit IV 14L

A] **Phenols:** Methods of formations a) from aniline b) from cumene. Acidic character, Reaction of Phenols- a) Carboxylation (Kolb's reaction), b) Fries Rearrangement, c) Claisen Rearrangement and d) Reimer – Tiemann reaction. [6]

B] **Ethers:** Diethyl ether- Preparation by Williamson's synthesis and continuous etherification process, Reactions-with cold and hot HI. [4]

C] **Epoxides:** Synthesis of ethylene oxide from ethylene and styrene oxide from styrene. Ring opening reactions of both catalysed by acid and alkali. [4]

Unit V - Physical Properties and Molecular Structure 14L

A] **Electrical Properties:**

(i) Polar and non-polar molecules. Dipole moment.

(ii) Induced polarization and orientation polarization. Clausius-Mossotti equation (only qualitative treatment).

(iii) Measurement of dipole moment by temperature and refractivity

2 : CHEMISTRY
Semester-V
5S Chemistry
(Effective from session 2015-16)

The examination in Chemistry of 5 th semester shall comprise of one theory paper, Internal assessment and practical examination. Theory paper will be of 3 Hrs. duration and carry 80 marks. The internal assessment will carry 20 marks. The practical examination will be of 6 hours duration and carry 50 marks.

The following syllabi is prescribed on the basis of six lectures per week and 6 practical periods per batch per week. Each theory paper has been divided into 6 units. There shall be one question in every unit with internal choice for each of 12 marks & one compulsory question covering all the syllabus of Semester-V (8 marks).

Unit IV 14L

A) **Dyes:** Classification on the basis of structure and mode of application, Preparation and uses of Methyl orange, Crystal violet, Phenolphthalein, Alizarin and Indigo. [5]

B) **Drugs:** Analgesic and antipyretics: Synthesis and uses of phenylbutazone. Sulpha drugs: Synthesis and uses of sulphanilamide and sulphadiazine. Antimalarials: Synthesis of chloroquine from 4,7-dichloroquinoline and its uses. [5]

C) **Pesticides:** Insecticides:Synthesis and uses of malathion. Herbicides: Synthesis and uses of 2,4-dichloro phenoxy acetic acid (2,4-D). Fungicides: Synthesis and uses of thiram (tetramethyl thiuram disulphide. [4]

Unit V- Photochemistry 14L

(i) Photochemical and thermal reactions. (ii) Lambert's law - Statement and derivation, Beer's law - Statement and derivation. Reasons for deviation from Beer's law. (iii) Laws of photochemistry (iv) Quantum yield of photochemical reaction. Reasons for high and low quantum yield. Experimental determination of quantum yield. Photosensitized reaction. (v) Kinetics of photochemical decomposition of HI. (vi) Fluorescence and Phosphorescence. Selection rule for electronic transition. Internal conversion and inter-system crossing. Explanation of fluorescence and phosphorescence on the basis of Jablonski diagram. (vii) Chemiluminescence and Bioluminescence with examples. (viii) Numericals. [14]

Unit VI- Molecular Spectroscopy 14L

(i) Electromagnetic radiation, characteristics of electromagnetic radiation in terms of wavelength, wave number, frequency and energy of photon. Spectrum of electromagnetic radiation. (ii) Types of spectra - Emission and absorption spectra, atomic and molecular spectra, line and band spectra (iii) Translational, vibrational, rotational and electronic motion. The degree of freedom in each motion. (iv) Energy level diagram of a molecule indicating electronic, vibrational and rotational transitions. (v) Condition for pure rotational spectrum (i.e. microwave active molecules), selection rule for rotational transition. Derivation of expression

B) Chelates : Definition, classification and applications of chelates in analytical chemistry. Stability of chelate with special reference to chelate effect. [5]

Unit II

A) Crystal Field Theory (CFT): Postulates of CFT, Crystal field splitting in octahedral, distorted octahedral, square planar tetrahedral complexes, concept of CFSE, high spin and low spin complexes on the basis of Δ_o and pairing energy, distribution of electrons in t_{2g} and e_g orbitals in high spin and low spin octahedral complexes, Factor affecting magnitude of crystal field splitting in octahedral complexes. [9]

B) Electronic Spectra of Transition Metal Complexes : Introduction to spectra, selection rules for d-d transitions, spectroscopic terms determination of ground term symbols for d^1 to d^{10}, spectra of d^1 and d^9 octahedral complexes, Orgel diagrams for

rule for vibrational transition. Vibrational energy levels of a simple harmonic oscillator. Zero point energy, position of a spectral line. Determination of force constant of a covalent bond. (v) Raman effect - Raman's spectrum of a molecule. Condition for exhibiting Raman spectrum (i.e. Raman active molecule), selection rule for rotational transitions. Pure rotational spectrum of diatomic molecule, vibrational Raman spectrum of a diatomic molecule. (vii) Numericals. [14]

Semester- V
5S Chemistry Practicals

Total Laboratory sessions: 26 **Marks: 50**

Exercise I: Inorganic Preparations **12 Laboratory sessions**

1. Preparation of tetraamminecopper(II)sulphate.
2. Preparation of hexaamminenickel(II)chloride.
3. Preparation of potassiumtrioxalate aluminate(III).
4. Preparation of Prussian blue.
5. Preparation of chrome alum.
6. Preparation of sodium thiosulphate and dithionite.

(Comment on VB structure, magnetic properties and color of 1, 2 and 3 complexes)

Exercise II: Physical Chemistry experiments 14 Laboratory sessions

(Standard oxalic acid solution should be prepared by the students)

1. To determine strength of given HCl solution conductometrically.
2. To determine strength of given CH_3COOH solution conductometrically.
3. To determine strength of given HCl solution potentiometrically.
4. To determine strength of HCl and CH_3COOH in a given mixture conductometrically.
5. To determine redox potential of Fe^{+3}-Fe^{+2} system potentiometrically.
6. To determine molecular weight by Rast's method.
7. To determine specific rotation of optically active compound by Polarimeter.