SANT GHIRA GURU VISHWAVIDYALAYA
SARGUJA AMBIKAPUR (C.G.)

CHOICE BASED CREDIT SYSTEM
(CBCS)
2018-19

Syllabus

M.A. ~~Socilogy~~ Sociology

FIRST SEMESTER (CBCS)

PART-1

Course Code	Course Type	Course(Paper /Subjects) Compulsory paper	Credits	Contact Hours Per Week			Ease Duration (Hrs.)		Marks	
									SEE	IA
				L	T	P	Thy	P		
MAS 101	CCC	CLASSICAL SOCIOLOGICAL TRADITION	6	4	3	00	3	0	70	30
MAS102	CCC	SOCIAL ANTHROPOLOGY	6	4	3	00	3	0	70	30
MAS103	CCC	SOCIAL CHANGE IN INDIA	6	4	3	00	3	00	70	30
MAS111	CCC	METHODOLOGY IN SOCIAL RESEACH	6	00	00	08	0	3	70	30
		OPTIONAL PAPER								
MAS02	ECC/CB	GENDER AND SOCIETY	6	4	3	00	3	00	70	30
MASA05	ECC/CB	URBAN SOCIOLOGY	6	4	3	00	3	00	70	30

M.A. SOCIOLOGY SECOND SEMESTER (CBCS)

Course Code	Course Type	Course(Paper /Subjects) **Compulsory paper**	Credits	Contact Hours Per Week			Eose Duration (Hrs.)		Marks	
									SEE	IA
				L	T	P	Thy	P		
MAS 101	CCC	CLASSICAL SOCIOLOGICAL TRADITION	6	4	3	00	3	0	70	30
MAS102	CCC	SOCIAL ANTHROPOLOGY	6	4	3	00	3	0	70	30
MAS103	CCC	SOCIAL CHANGE IN0NDIA	6	4	3	00	3	0	70	3
MAS111	CCC	FIELD WORK	6	00	00	08	0	3	100	00
		OPTIONAL PAPER								
MAS02	ECC/CB	GENDER AND SOCIETY	6	4	3	00	3	00	70	00
MAS▲05	ECC/CB	URBAN SOCIOLOGY	6	4	3	00	3	00	70	00

PART-3

M.A. SOCIOLOGY THIRD SEMESTER (CBCS)

Course Code	Course Type	Course(Paper /Subjects) Compulsory paper	Credits	Contact Hours Per Week			Eose Duration (Hrs.)		Marks	
									SEE	IA
				L	T	P	Thy	P		
MAS 301	CCC	CLASSICAL SOCIOLOGICAL THEORY	6	4	3	00	3	0	70	30
MAS 302	CCC	PERSPECTIVE ON INDIAN SOCIETY	6	4	3	00	3	0	70	30
MAS 303	CCC	CRIMINOLOGY - I	6	4	3	00	3	0	70	30
		OPTIONAL PAPER								
MAS 301	OSC	INTELLECTUAL PROPERTY, HUMAN RIGHTS & ENVIRONMENT : BASICS	6	4	3	00	3	0	70	30
MAS301	ECC/CB	TRIBAL STUDIES	6	4	3	00	3	0	70	30
MAS 302	ECC/CB	SOCIAL DEMOGRAPHY	6	4	3	00	3	0	70	30
MAS 303	ECC/CB	SOCIAL MOVEMENTS IN INDIA	6	4	3	00	3	0	70	30

PART-4

M.A. SOCIOLOGY FOURTH SEMESTER (CBCS)

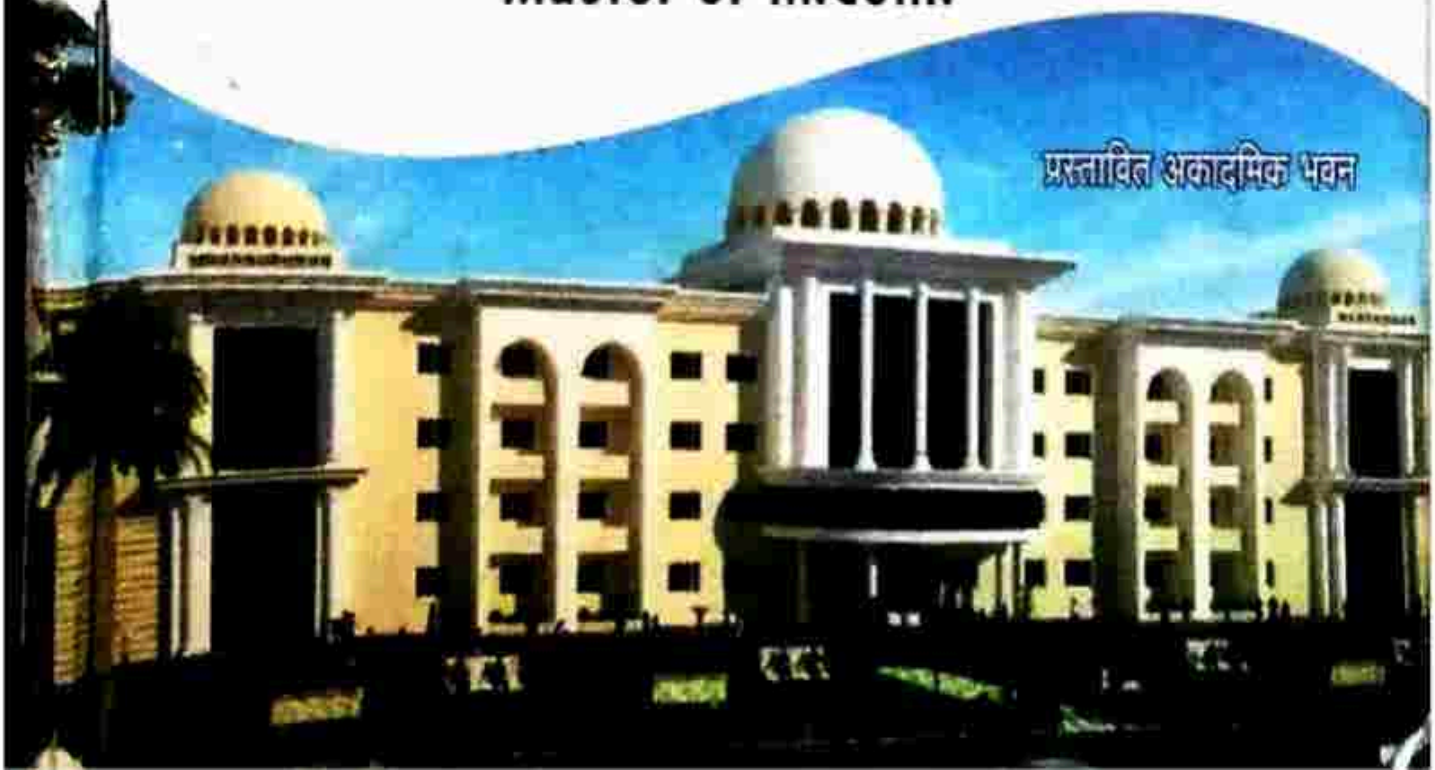
Course Code	Course Type	Course(Paper /Subjects)	Credits	Contact Hours Per Week			Eose Duration (Hrs.)		Marks	
									SEE	IA
				L	T	P	Thy	P		
		Compulsory paper		L	T	P	Thy	P		
MAS 401	CCC	MODERN SOCIOLOGICAL THEORY	6	4	3	00	3	0	70	30
MAS 402	CCC	COMPARATIVE SOCIOLOGY	6	4	3	00	3	0	70	30
MAS 303	CCC	CRIMINOLOGY-II	6	4	3	00	3	0	70	30
MAS 304	PRJ/SSC	DISSERTATION	6	4	3	00	3	0	70	30
		OPTIONAL PAPER			•					
MASD01	ECC/CB	URBAN SOCIETY IN INDIA	6	4	3	00	3	0	70	30
MAD02	ECC/CB	SOCIOLOGY OF DISASTER MGT. AND DISASTER PLANNING	6	4	3	00	3	0	70	30

SANT GHIRA GURU VISHWAVIDYALAYA SARGUJA AMBIKAPUR (C.G.)

CHOICE BASED CREDIT SYSTEM (CBCS) 2018-19

Syllabus

Master of M.Com.



M. COM. FIRST SEMESTER

Course Code	Paper/Subject	Credit	Contract Hour Per Week			EoSE Duration (Hrs.)	
			L	T	P	THY	P
MCM 101	Managerial Economics	6	4	3	0	3	0
MCM 102	Advanced Accounting	6	4	3	0	3	0
MCM 103	Management Accounting	6	4	3	0	3	0
MCMSO1-OSC (Compulsory)	Research Methodology & Computer Application Basics	6	4	3	0	3	0
ECC/CB –A01	Constitutionalism & Indian Political System	6	4	3	0	3	0
ECC/CB - A02	Advanced Business Statistics						
ECC/CB - A03	Business Finance						
ECC/CB - A04	Marketing Management						
ECC/CB - A05	Principle of Marketing						
MINIMUM CREDIT IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30		30					

M. COM. SECOND SEMESTER

Course Code	Paper/Subject	Credit	Contract Hour Per			EoSE (Hrs.)	
			L	T	P	THY	P
MCM 201	Business Economics	6	4	3	0	3	0
MCM 202	Specialized Accounting	6	4	3	0	3	0
MCM 203	Accounting for Managerial Decision	6	4	3	0	3	0
MCM SO2-OSC (Compulsory)	Social Outreach & Skill Development	6	4	3	0	3	0
ECC/CB-B01	Environment & Forest Law	6	4	3	0	3	0
ECC/CB-B02	Advanced Statistics						
ECC/CB-B03	Business Law						
ECC/CB-B04	Marketing Strategy						
ECC/CB-B05	Advertising & Sales Management						
ECC/CB-B06	Personnel Management						
MINIMUM CREDIT IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30		30					

M. COM. THIRD SEMESTER

Course Code	Paper/Subject	Credit	Contract Hour Per			EoSE (Hrs.)	
			L	T	P	THY	P
MCM 301	Management Concept	6	4	3	0	3	0
MCM 302	Organization Behaviour	6	4	3	0	3	0
MCM 303	Advanced Cost Accounting	6	4	3	0	3	0
MCMSO3-OSC (Compulsory)	Intellectual Properties, Human Rights & Environment Basics	6	4	3	0	3	0
ECC- 001	Tribal Studies	6	4	3	0	3	0
ECC - 002	Strategic Management						
ECC - 003	International Marketing						
ECC - 004	Production Management						
ECC - 005	Life Insurance						
ECC - 006	Accounting Methods						
MINIMUM CREDIT IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30		30					

M. COM. FORTH SEMESTER

Course Code	Paper/Subject	Credit	Contract Hour Per			EoSE (Hrs.)	
			L	T	P	THY	P
MCM 401	Corporate Legal Framework	6	4	3	0	3	0
MCM 402	Marketing Research	6	4	3	0	3	0
MCM 403	Investment Management	6	4	3	0	3	0
MCMSO4-OSC (Compulsory)	Dissertation	6	4	3	0	3	0
ECC –D01	Consumer Behavior	6	4	3	0	3	0
ECC- D02	Financial Institution and Markets						
ECC - D03	Goods & Service Taxes - GST						
ECC - D04	Industrial Law						
ECC - D05	Bank Management						
ECC - D06	Introduction to Information Technology						
MINIMUM CREDIT IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30		30					

NT GHIRA GURU VISHWAVIDYALAYA
SARGUJA AMBIKAPUR (C.G.)

CHOICE BASED CREDIT SYSTEM
(CBCS)
2018-19

Syllabus

M.Sc.Chemistry

M.Sc. CHEMISTRY FIRST SEMESTER

First Semester (CBCS)

Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)		Marks	
				L	T	P	Thy	P	SEE	IA
MSC 101	CCC	INORGANICCHEMISTRY-1	6	4	3	0	3	0	80	20
MSC 102	CCC	ORGANICCHEMISTRY-1	6	4	3	0	3	0	80	20
MSC 103	CCC	ANALYTICAL CHEMISTRY	6	4	3	0	3	0	80	20
MSC 111	CCC	INORGANIC AND ANALYTICAL CHEMISTRY-1 LAB	6	0	0	9	0		100	
MSC S01	OSC	RESEARCH METHODOLOGY & COMPUTER APPLICATION: BASICS	6	4	3	0	3	0	80	20
MSC A01	ECC/CB	CONSTITUTIONALISM & INDIAN POLITICAL SYSTEM	6	4	3	0	3	0	80	20
MSC A02	ECC/CB	GROUP THEORY, SPECTROSCOPY AND DIFFRACTION METHODS								
MSC A03	ECC/CB	COMPUTER PROGRAMMING IN CHEMISTRY								
MSC A04	ECC/CB	MEDICINAL CHEMISTRY								
MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			Total Credit= 36							

Second Semester (CBCS)

Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)		Marks	
				L	T	P	Thy	P	SEE	IA
MSC 201	CCC	INORGANICCHEMISTRY-2	6	4	3	0	3	0	80	20
MSC 202	CCC	ORGANICCHEMISTRY-2	6	4	3	0	3	0	80	20
MSc 203	CCC	PHYSICALCHEMISTRY	6	4	3	0	3	0	80	20
MSC 211	CCC	ORGANIC AND PHYSICALCHEMISTRYLAB	6	0	0	9	0		100	
MSC S02	PRJ/SSC	SOCIAL OUTREACH AND SKIL DEVELOPMENT	6	4	3	0	3	0	80	20
MSC B01	ECC/CB	ENVIRONMENTAL AND FOREST LAWS	6	4	3	0	3	0	80	20
MSC B02	ECC/CB	POLYMER CHEMISTRY								
MSC B03	ECC/CB	ORGANIC SYNTHESIS-1								
MSC B04	ECC/CB	APPLIED CHEMISTRY								
MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			Total Credit= 36							

Third Semester (CBCS)

Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per Week			ExSE Duration (Hrs.)		Marks	
				L	T	P	Thy	P	SEE	IA
MSC 301	CCC	APPLICATIONS OF SPECTROSCOPY-INORGANIC CHEMISTRY	6	4	3	0	3	0	80	20
MSC 302	CCC	APPLICATIONS OF SPECTROSCOPY-ORGANIC CHEMISTRY	6	4	3	0	3	0	80	20
MSC 303	CCC	PHOTOCHEMISTRY AND PERICYCLIC REACTION	6	4	3	0	3	0	80	20
MSC 311	CCC	ORGANIC CHEMISTRY LAB	6	0	0	9	0		100	
MSC 503	OEC	INTELLECTUAL PROPERTY, HUMAN RIGHTS & ENVIRONMENT: BASICS	6	4	3	0	3	0	80	20
MSC CE1	ECCCB	TRIBAL STUDIES	6	4	3	0	3	0	80	20
MSc CE2	ECCCB	GREEN CHEMISTRY								
MSC CE3	ECCCB	ORGANIC SYNTHESIS II								
MSC CE4	ECCCB	HETEROCYCLIC CHEMISTRY								
MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			Total Credits 30							

Fourth Semester (CBCS)

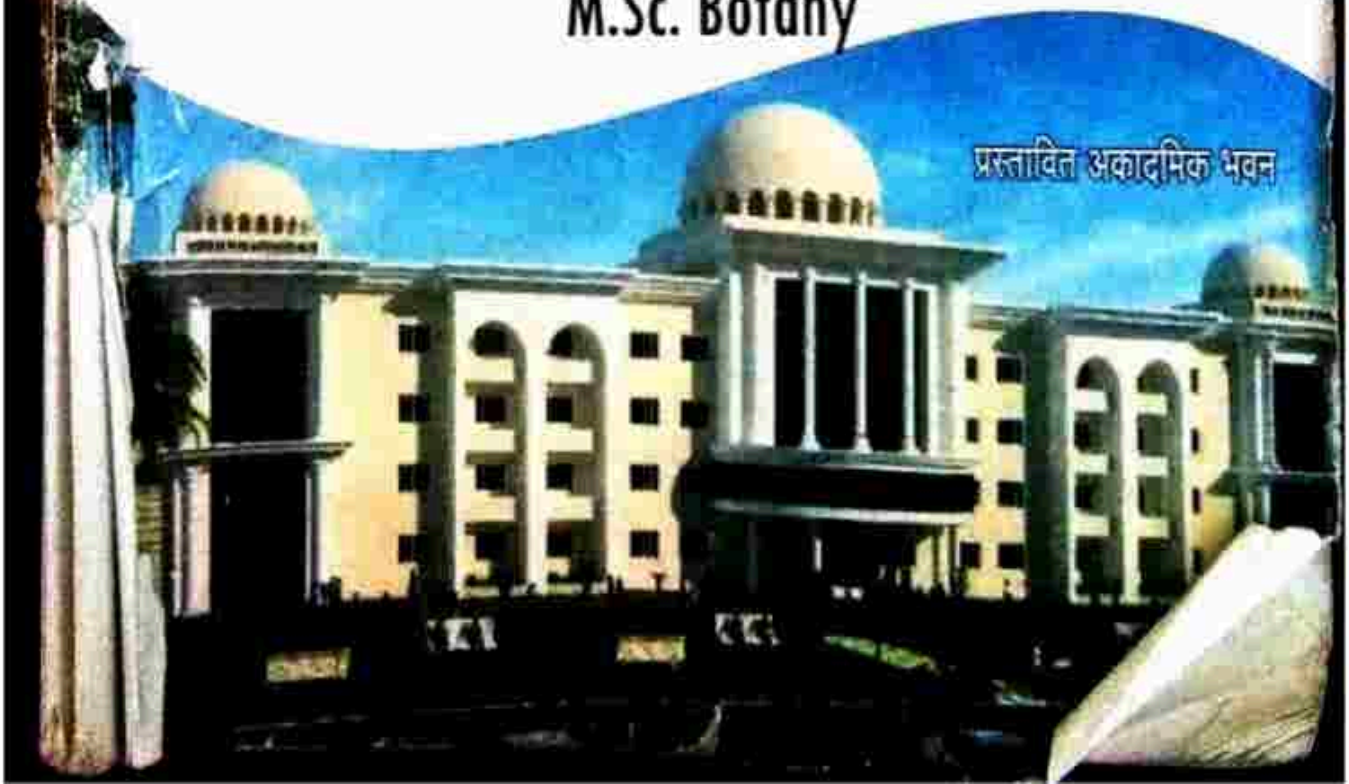
Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)		Marks	
				L	T	P	Thy	P	SEE	IA
MSC 401	CCC	BIOINORGANIC CHEMISTRY	6	4	3	0	3	0	80	20
MSC 402	CCC	ENVIRONMENTAL CHEMISTRY	6	4	3	0	3	0	80	20
MSC 403	CCC	SOLID STATE CHEMISTRY	6	4	3	0	3	0	80	20
MSC 411	CCC	GENERAL CHEMISTRY LAB	6	0	0	9	3	0	100	
MSC S04	PRJ/SSC	DISSERTATION	6	4	3	0	3	0	80	20
MSC D01	ECC/CB	PHOTOINORGANIC CHEMISTRY	6	4	3	0	3	0	80	20
MSC D02	ECC/CB	MATERIAL SCIENCE								
MSC D03	ECC/CB	CHEMISTRY OF NATURAL PRODUCT								
MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			Total Credit = 36							

SANT GHIRA GURU VISHWAVIDYALAYA
SARGUJA AMBIKAPUR (C.G.)

CHOICE BASED CREDIT SYSTEM
(CBCS)
2018-19

Syllabus

M.Sc. Botany



		MBT101	CCC	CELL AND MOLECULAR BIOLOGY	5	4	2	0	3	0
Bachelor Degree in any Science (Pure & Bioscience)	1) Merit List 2) Entrance Test (written or/and oral) if decided by the University 3) Observance of Reservation Policy.	MBT111	CCC	CELL AND MOLECULAR BIOLOGY (PRACTICAL)	2	00	00	3	0	3
		MBT102	CCC	GENETICS AND CYTOGENETICS	5	4	2	0	3	0
		MBT112	CCC	GENETICS AND CYTOGENETICS (PRACTICAL)	2	00	00	3	0	3
		MBT103	CCC	PHYSIOLOGY AND BIOCHEMISTRY	5	4	2	0	3	0
		MBT113	CCC	PHYSIOLOGY AND BIOCHEMISTRY (PRACTICAL)	2	00	00	3	0	3
		MBT S01	OSC	RESEARCH METHODOLOGY & COMPUTER APPLICATION: BASICS	6	4	3	00	3	00
		MBT A01	ECC/CB	CONSTITUTIONALISM & INDIAN POLITICAL SYSTEM	6	4	3	00	3	00
		MBT A02	ECC/CB	RECOMBINANT DNA TECHNOLOGY AND PROTEOMICS						
					TOTAL= 33					

Eligibility Criteria (Qualifying Exams)	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
After appearing in the First semester examinationir respective of any number of back/ arrear papers	MBT201	CCC	DEVELOPMENTAL BIOLOGY	5	4	2	00	3	00
	MBT211	CCC	DEVELOPMENTAL BIOLOGY (PRACTICAL)	2	00	00	3	00	3
	MBT202	CCC	PATHOGENS AND PESTS OF CROP PLANTS	5	4	2	00	3	0
	MBT212	CCC	PATHOGENS AND PESTS OF CROP PLANTS (PRACTICAL)	2	00	00	3	00	3
	MBT203	CCC	PLANT BIOTECHNOLOGY AND RESOURCE UTILIZATION	5	4	2	00	3	0
	MBT213	CCC	PLANT BIOTECHNOLOGY AND RESOURCE UTILIZATION (PRACTICAL)	2	00	00	3	00	3
	MBT 221	PRJ/FST/EST	SOCIAL OUTREACH AND SKILL DEVELOPMENT	6	00	00	9	00	4
	MBT B01	ECC/CB	ENVIRONMENTAL AND FOREST LAWS	6	4	3	00	3	00
	MBT B02	ECC/CB	SYSTEMATICS, EVOLUTION AND ENVIRONMENTAL SCIENCE						
				TOTAL= 33					

Eligibility Criteria (Qualifying Exams)	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
After appearing in the Second semester examination irrespective of any number of back/ arrear papers	MBT 301	CCC	ALGAE, ENVIRONMENT AND HUMAN WELFARE	5	4	2	00	3	00
	MBT 311	CCC	ALGAE, ENVIRONMENT AND HUMAN WELFARE (PRACTICAL)	2	00	00	3	00	3
	MBT 302	CCC	PRINCIPLES OF ECOLOGY	5	4	2	00	3	00
	MBT 312	CCC	PRINCIPLES OF ECOLOGY (PRACTICAL)	2	00	00	3	00	3
	MBT 303	CCC	ADVANCES IN ARCHEGONIATAE	5	4	2	00	3	00
	MBT 313	CCC	ADVANCES IN ARCHEGONIATAE (PRACTICAL)	2	00	00	3	00	3
	MBT 502	OSC	INTELLECTUAL PROPERTY, HUMAN RIGHTS & ENVIRONMENT: BASICS	5	4	3	00	3	00
	MBT C01	ECC/CB	TRIBAL STUDIES	6	4	3	00	3	00
	MBT C02	ECC/CB	MICROBES AND MICROBIAL TECHNOLOGY						
	MBT C03	ECC/CB	EVOLUTIONARY BIOLOGY						
	MBT C04	ECC/CB	BIOINFORMATICS, COMPUTATIONAL BIOLOGY AND BIOSTATISTICS						
	MBT C05	ECC/CB	GENOMICS AND PROTEOMICS						
	MBT C06	ECC/CB	IMMUNOLOGY						
				TOTAL= 33					

Eligibility Criteria (Qualifying Exams)	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
After appearing in the Third semester examination irrespective of any number of back/ arrear papers	MBT 401	CCC	IN VITRO TECHNOLOGIES AND INDUSTRIAL APPLICATIONS	5	4	2	00	3	00
	MBT 411	CCC	IN VITRO TECHNOLOGIES AND INDUSTRIAL APPLICATIONS (PRACTICAL)	2	00	00	3	00	3
	MBT 40A2	CCC	REPRODUCTIVE BIOLOGY OF FLOWERING PLANTS	5	4	2	00	3	00
	MBT 412	CCC	REPRODUCTIVE BIOLOGY OF FLOWERING PLANTS	2	00	00	3	00	3
	MBT 403	CCC	MOLECULAR INTERACTIONS OF PLANTS WITH SYMBIONTS, PATHOGENS & PESTS	5	4	2	00	3	00
	MBT 413	CCC	MOLECULAR INTERACTIONS OF PLANTS WITH SYMBIONTS, PATHOGENS AND PESTS (PRACTICAL)	2	00	00	3	00	3
	MBT 421	SSC/PRJ	DISSERTATION	6	00	00	9	00	4
	MBT D01	ECC/CB	ADVANCED GENETICS AND PLANT BREEDING	6	4	3	00	3	00
	MBT D02	ECC/CB	AGRICULTURAL ECOLOGY – PRINCIPLES AND APPLICATIONS						
	MBT D03	ECC/CB	ADVANCED PLANT SYSTEMATICS						
	MBT D04	ECC/CB	CONTEMPORARY CONCEPTS AND METHODS IN CELL BIOLOGY						
	MBT D05	ECC/CB	PLANT PHYSIOLOGY AND BIOCHEMISTRY	Total=33					

SANT GHIRA GURU VISHWAVIDYALAYA
SARGUJA AMBIKAPUR (C.G.)

CHOICE BASED CREDIT SYSTEM
(CBCS)
2018-19

Syllabus

M.A.History

M.A. HISTORY

First Semester (CBCS)

Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)		Marks	
				L	T	P	Thy	P	SEE	IA
MAH 101	CCC	CONCEPT OF HISTORY	6	4	3	0	3	0	70	30
MAH 102	CCC	MODERN WORLD	6	4	3	0	3	0	70	30
MAH 103	CCC	ANCIENT AND MEDIEVAL CHHATTISGARH	6	4	3	0	3	0	70	30
MAH S01	OSC	RESEARCH METHODOLOGY AND COMPUTER APPLICATION: BASICS	6	4	3	0	3	0	70	30
MAH A01	BCC/ CB	HISTORY OF GREAT BRITAIN 1815-1885 AD	6	4	3	0	3	0	70	30
MAH A02	BCC/ CB	HISTORY OF CHINA & JAPAN 1800-1911 AD								
MAH A03	BCC/ CB	WOMEN IN INDIAN HISTORY IN ANCIENT & MEDIEVAL PERIOD								
MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			30							

M.A. HISTORY

Second Semester (CBCS)

Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)		Marks	
				L	T	P	Thy	P	SEE	IA
MAH 201	CCC	HISTORIOGRAHY	6	4	3	0	3	0	70	30
MAH 202	CCC	CONTEMPORARY WORLD	6	4	3	0	3	0	70	30
MAH 203	CCC	MODERN CHHATTISGARH	6	4	3	0	3	0	70	30
MAH S02	OSC	SOCIAL OUTREACH AND SKILL DEVELOPMENT	6	4	3	0	3	0	70	30
MAH B01	BCC/ CB	MODERN ENGLAND 1885-1956 AD	6	4	3	0	3	0	70	30
MAH B02	BCC/ CB	HISTORY OF CHINA & JAPAN 1911-1950 AD								
MAH B03	BCC/ CB	WOMEN IN INDIAN HISTORY IN MODERN PERIOD								
MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			30							

M.A. HISTORY
Third Semester (CBCS)

Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)		Marks	
				L	T	P	Thy	P	SEE	IA
MAH 301	CCC	HISTORY OF NATIONAL MOVEMENT (1857 AD - 1922AD)	6	4	3	0	3	0	70	30
MAH 302	CCC	ANCIENT INDIA – 2500 BC TO 1000 AD	6	4	3	0	3	0	70	30
MAH 303	CCC	INDIAN POLITY AND ECONOMY IN SULTANATE PERIOD (1200-1526 A.D.)	6	4	3	0	3	0	70	30
MAH S03	OSC	INTELLECTUAL PROPERTY, HUMAN RIGHTS & ENVIRONMENT: BASICS	6	4	3	0	3	0	70	30
MAH C01	ECC/ CB	Cultural History of India	6	4	3	0	3	0	70	30
MAH C02	ECC/ CB	History of Science and Technology in India								
MAH C03	ECC/ CB	Thinkers of Modern India (1920 to 2000 AD)								
MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			30							

M.A. HISTORY
Fourth Semester (CBCS)

Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)		Marks	
				L	T	P	Thy	P	SEE	IA
MAH 401	CCC	HISTORY OF NATIONAL MOVEMENT (1922 to 1947 A.D.)	6	4	3	0	3	0	70	30
MAH 402	CCC	Indian Polity and Economy in Mughal Period	6	4	3	0	3	0	70	30
MAH 403	CCC	Modern India 1858 A.D. to 1964 A.D. (Political, Administrative)	6	4	3	0	3	0	70	30
MAH S04	OSC	DISSERTATION	6	4	3	0	3	0	70	30
MAH D01	ECC /CB	Gandhism Theory and Practice	6	4	3	0	3	0	70	30
MAH D02	ECC /CB	The Evolution of Human Rights in the 20th Century								
MAH D03	ECC /CB	Tourism Theory and Principles In Reference of History								
MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			30							

SANT GHIRA GURU VISHWAVIDYALAYA SARGUJA AMBIKAPUR (C.G.)

CHOICE BASED CREDIT SYSTEM (CBCS) 2018-19

Syllabus

M.A.Political Science

Syllabus of M.A. (Political Science) for Regular Mode (CBCS Pattern-2018)

M.A. (Political science) FIRST SEMESTER

Eligibility criteria	Admission Criteria	Course code	Course Type	Name of Papers	Credits	Teaching Hours Per Week	
						Lecture	Tutorial
Bachelor Degree in Concerned Subjects and According to CG Higher Education Guideline	1. Merit List 2. Entrance Test (written or/and oral) 3. Observation of Reservation Policy	MAP 101	CCC	DEBATES IN POLITICAL THEORY	6	4	3
		MAP 102	CCC	COMPARATIVE POLITICAL ANALYSIS	6	4	3
		MAP 103	CCC	INDIAN GOVERNMENT AND POLITICS	6	4	3
		MAP 501	OSC	RESEARCH METHODOLOGY & COMPUTER APPLICATION: BASICS	6	4	3
		MAP A01	ECC/CB	THEORIES OF INTERNATIONAL RELATIONS	6	4	3
		MAP A02	ECC/CB	INTERPRETENG MODERN INDIA			
		MAP A03	ECC/CB	CONTEMPORARY DEBATES IN POLITICAL THEORY			
				Total	30		

Syllabus of M.A. (Political science) for Regular Mode (CBCS Pattern-2018)

M.A. (Political science) SECOND SEMESTER

Eligibility criteria (Qualifying Exam)	Course code	Course Type	Name of Papers	Credits	Teaching Hours Per Week	
					Lecture	Tutorial
After appearing in the first semester examination irrespective of any number of back/ error paper	MAP 201	CCC	ADMINISTRATIVE THEORY: PRINCIPLES AND APPROACHES	6	4	3
	MAP 202	CCC	THEMES IN INDIAN POLITICAL THOUGHT	6	4	3
	MAP 203	CCC	WESTERN POLITICAL THOUGHT	6	4	3
	MAP 221	PRJPS/DEST	SOCIAL OUTREACH AND SKILL DEVELOPMENT	6	4	3
	MAP 001	ECC/CB	ETHICS AND POLITICS	6	4	3
	MAP 002	ECC/CB	CRITICAL TRADITIONS IN POLITICAL THEORY			
	MAP 003	ECC/CB	SOCIAL MOVEMENTS AND REVOLUTIONS			
			Total	30		

Syllabus of M.A. (Political science) for Regular Mode (CBCS Pattern-2018)

M.A. (Political science) THIRD SEMESTER

Eligibility criteria Qualifying Exam)	Course code	Course Type	Name of Papers	Credits	Teaching Hours Per Week	
					Lecture	Tutorial
After appearing in the second semester examination irrespective of any number of back/ error paper	MAP 301	CCC	DEMOCRACY AND POLITICAL INSTITUTIONS IN INDIA	6	4	3
	MAP 302	CCC	PARTIES, ELECTIONS AND POLITICAL PROCESS IN INDIA	6	4	3
	MAP 303	CCC	INDIAN POLITICAL THOUGHT	6	4	3
	MAP S02	OSC	INTELLECTUAL PROPERTY RIGHTS, HUMAN RIGHTS & ENVIRONMENT: BASICS	6	4	3
	MAP C01	ECC/CB	TRIBAL STUDIES	6	4	3
	MAP C02	ECC/CB	DEMOCRACY AND HUMAN RIGHTS IN INDIA			
	MAP C03	ECC/CB	ADMINISTRATIVE THEORY			
			Total	30		

Syllabus of M.A. (Political science) for Regular Mode (CBCS Pattern-2018)

M.A. (Political science) FOURTH SEMESTER

Eligibility criteria (Qualifying Exam)	Course code	Course Type	Name of Papers	Credits	Teaching Hours Per Week	
					Lecture	Tutorial
After appearing in the third semester examination irrespective of any number of back/ error paper	MAP 401	CCC	PRINCIPLES OF INTERNATIONAL POLITICS	6	4	3
	MAP 402	CCC	INDIA AND THE WORLD	6	4	3
	MAP 403	CCC	POLITICAL HISTORY OF CHHATTISGARH	6	4	3
	MAP 411	SSC/PRJ	DISSERTATION'	6	4	3
	MAP D01	ECC/CB	FOREIGN POLICY OF MAJOR POWERS	6	4	3
	MAP D02	ECC/CB	DEVELOPMENT PROCESS AND POLITICS IN INDIA			
	MAP D03	ECC/CB	INTERNATIONAL SECURITY			
			Total	30		

GHIRA GURU VISHWAVIDYALAYA
SARGUJA AMBIKAPUR (C.G.)

CHOICE BASED CREDIT SYSTEM
(CBCS)
2018-19

Syllabus

Master of M.A. HINDI

M. A. in HINDI

FACULTY OF ARTS

FIRST SEMESTER (ODD SEMESTER)

Course Code	Course Type	Course (Paper/Subject)	Credits	Course Hours Per Week			Exam (Hrs)	
				L	T	P	Th	P
HIC 101	CC	हिंदी साहित्य का इतिहास	06	4	2	04	3	03
HIC 102	CC	प्राचीन एवं मध्यकालीन काव्य	06	4	2	04	3	03
HIC 103	CC	हिंदी भाषा एवं भाषा विज्ञान	06	4	2	04	3	03
HIC 201	PROJECT	शोध प्रविधि एवं कम्प्यूटर एप्लीकेशन की पृष्ठभूमि	06	4	2	04	3	03
HIC A01	ECC1	पर्यावरणीय एवं मानवी हिंदी						
HIC A11	ECC2	गीत गाये कबीर						
HIC A12	ECC3	भक्तिकाव्य पुनरदय	06	4	2	04	3	03
HIC A04	ECC3	महादेवि छायावाद						
HIC A05	ECC3	महादेवि छायावाद विचार						
HIC A06	ECC3	आचार्य रामचन्द्र शुक्ल						
MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			TOTAL-30					

DEPARTMENT OF HINDI

- **M. A. in HINDI :**

FACULTY OF ARTS

- **SECOND SEMESTER** (EVEN SEMESTER)

Eligibility Criteria (Qualifying Exams)	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
After appearing in the First semester examination irrespective of any number of back/ arrear papers	HND 201	CCC	आधुनिक काव्य	06	4	3	00	3	00
	HND 202	CCC	कथा साहित्य	06	4	3	00	3	00
	HND 203	CCC	भारतीय काव्य शास्त्र	06	4	3	00	3	00
	HND SO1	OSC	सामाजिक अधिगम और कौशल विकास	06	4	3	00	3	00
	HNDB 01	ECC/CB	भारतीय राजनैतिक व्यवस्था एवं संवैधानिकता	06	4	3	00	3	00
	HNDB 02	ECC/CB	आदिकाव्य						
	HNDB 03	ECC/CB	संत काव्य						
	HNDB 04	ECC/CB	रीति काव्य						
	HNDB 05	ECC/CB	छायावाद काव्य						
	HNDB 06	ECC/CB	स्वातंत्र्योत्तर हिंदी काव्य						
	MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			TOTAL= 30					

DEPARTMENT OF HINDI

- M.A. in HINDI

FACULTY OF ARTS

- THIRD SEMESTER (ODD SEMESTER)

Eligibility Criteria (Qualifying Exams)	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per Week			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
After appearing in the Second semester examination irrespective of any number of back/ arrear papers	HIND 301	CCC	हिंदी निबंध एवं अन्य गद्य विधाएं	06	4	2	00	3	00
	HIND 302	CCC	छायावादोत्तर हिंदी काव्य	06	4	2	00	3	00
	HIND 303	CCC	भारतीय काव्य शास्त्र	06	4	2	00	3	00
	HIND 3[illegible]	[illegible]	बौद्धिक संपदा, मानवाधिकार एवं पर्यावरण : पृष्ठभूमि	06	4	2	00	3	00
			जनजातीय अध्ययन						
	HIND-C 02	ECC/CS	हिंदी आलोचना						
			हिंदी साहित्य और भारतीय संस्कृति						
	HIND-C 04	ECC/CS	दृश्य श्रव्य माध्यम लेखन	06	4	2	00	3	00
			हिंदी नाटक एवं रंगमंच						
	HIND-C 0[illegible]	ECC/CS	दलित साहित्य						
	MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			TOTAL 30					

DEPARTMENT OF HINDI

- M. A. in HINDI :

FACULTY OF ARTS

- FOURTH SEMESTER (EVEN SEMESTER)

Eligibility Criteria (Qualifying Exams)	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
After appearing in the Third semester examination irrespective of any number of back/ arrear papers	HND 401	CCC	भारतीय साहित्य ✓	06	4	3	00	3	00
	HND 402	CCC	हिन्दी पत्रकारिता	06	4	3	00	3	00
	HND 403	CCC	प्रयोजनमूलक हिंदी ✓	06	4	3	00	3	00
	HND 421	SSC	लघु शोध प्रबंध	06	00	00	9	00	4
			प्रायोगिक एवं मौखिकी	06	4	3	03	3	00
	HNDO 02	ECC/CB	भारतीय मूलभाषा पालि						
	HNDO 03	ECC/CB	अनुवाद विज्ञान						
	HNDO 04	ECC/CB	कोश विज्ञान						
	HNDO 05	ECC/CB	पाठालोचन						
	HNDO 06	ECC/CB	भाषा शिक्षण						
	MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			TOTAL= 30					

2 DEPARTMENT OF PHYSICS

- **M. Sc. in PHYSICS** **FACULTY OF SCIENCE**
- **THIRD SEMESTER** (ODD SEMESTER)

Eligibility Criteria (Qualifying Exams)	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
After appearing in the Second semester examination irrespective of any number of back/ arrear papers	MSP 301	CCC	Solid State Physics	6	4	3	0	3	0
	MSP 311	CCC	Solid State Lab	2	00	00	3	00	3
	MSP 302	CCC	Nuclear and Particle Physics	6	4	3	0	3	0
	MSP 312	CCC	Nuclear Lab	2	00	00	3	00	3
	MSP 303	CCC	Classical Electro Dynamics	6	4	3	0	3	0
	MSP S02	OSC	Intellectual Property, Human Rights &Environment: Basics	6	4	3	00	3	00
	MSP C01	ECC/CB	Tribal Studies	6	4	3	00	3	00
	MSP C02	ECC/CB	Microwave Electronics						
	MSP C03	ECC/CB	Nano Science						
	MSP C04	ECC/CB	High Energy Physics - III						
				TOTAL=34					

M.Sc. in PHYSICS (THIRD SEMESTER)			
COURSE CODE: MSP 301		**COURSE TYPE :** CCC	
COURSE TITLE: SOLID STATE PHYSICS			
CREDIT: 08 **THEORY:** 06 **PRACTICAL:** 02		**HOURS:** 135 **THEORY:** 90 **PRACTICAL:** 45	
MARKS: 100 **THEORY:** 70	**CCA :** 30	**PRACTICAL:** 50	
OBJECTIVE: The main objective is to learn about solid state physics .			
UNIT-1 20 Hrs.	Crystal Physics Types of lattices - Miller indices - simple crystal structures - Crystal diffraction - Bragg's law - Reciprocal lattice (sc, bcc, fcc) - Laue equations - Structure factor - Atomic form factor - Types of crystal binding - Cohesive energy of ionic crystals - Madelung constant - Inert gas crystals - Vander Waal - Landon equation - Metal crystals - Hydrogen bonded crystals.		
UNIT-2 15 Hrs	Lattice dynamics Monoatomic lattices - Lattice with two atoms per primitive cell - First Brillouin zone - Group and phase velocities - Quantization of lattice vibrations - Phonon momentum - Inelastic scattering by phonons - Debye's theory of lattice heat capacity - Einstein's model and Debye's model of specific heat - thermal expansion - Thermal conductivity - Umklapp processes.		
UNIT-3 20 Hrs	Theory of metals and semiconductors Free electrons gas in three dimensions - Electronic heat capacity - Wiedmann-Franz law - Hall effect - Band theory of metals and semiconductors - Bloch theorem - Kronig-Penny model - Semiconductors - Intrinsic carrier concentration - Mobility - Impurity conductivity - Fermi surfaces and construction - Experimental methods in Fermi surface studies - de Haas Van Alphen effect.		

UNIT-4 15Hrs	Magnetism Elementary ideas of dia, para and ferro magnetism - quantum theory of paramagnetism - Rare earth ion - Hund's rule - Quenching of orbital angular momentum - Adiabatic demagnetization - Quantum theory of ferromagnetism - Curie point - Exchange integral - Heisenberg's interpretation of Weiss field - ferromagnetic domains - Bloch Wall - Spin waves - Quantization - Magnons - thermal excitation of magnons - Curie temperature and susceptibility of ferrimagnets - Theory of antiferromagnetism - Neel temperature.
UNIT- 5 20Hrs	Super conductivity Experimental facts-occurrence - Effect of magnetic fields - Meissner effect - Entropy and heat capacity - Energy gap - Microwave and infrared properties - Type I and II superconductors - theoretical explanation - thermodynamics of super conducting transition - London equation - Coherence length - BCS Theory - single particle Tunneling - Josephson tunneling - DC and AC Josephson effects - High temperature super conductors - SQUIDS.
LABORATORY WORK MSP311	**CORE PRACTICAL III** **SOLID STATE PHYSICS LAB** 1. To study temperature variation of resistivity for a semi-conductor and to obtain band gap using four probe method. 2. To study hall effect and to determine hall coefficient. 3. To study the variation of rigidity of a given specimen as a function of the temperature. 4.To Study the Variation of magnetoresisitance of a sample with the applied Magnetic Field. 5. To Determine the phase diagram of alloys using cooling curve. 6. Indexing of a given XRD pattern and determination of lattice parameter. 7. To determine the wavelength using Michelson Interferometer. 8.Structure Factor calculation of Simple Crystal Structures. 9. Thermoluminescence Studies of Alkali Halides by X-Ray Radiations. 10. Size Estimation of Nano Crystals.

SUGGESTED READINGS

1. N.W. Aschroft and N.D. Mermin, Solid State Physics, Rhinehart and Winton, New York.

2. J.S. Blakemore, 1974, Solid State Physics, 2nd Edition, W.B. Saunder, Philadelphia.

3. A.J. Dekker, Solid State Physics, Macmillan India, New Delhi.

4. H.M. Rosenburg, 1993, The Solid State, 3rd Edition, Oxford University Press, Oxford.

5. S.O. Pillai, 1994, Problems and Solutions in Solid State Physics, New Age International, New Delhi.

6. S.L. Altmann, Band Theory of Metals, Pergamon, Oxford.

7. M.A. Wahab, 1999, Solid State Physics, Structure and Properties of Materials, Narosa, New Delhi.

8. J.M. Ziman, 1971, Principles of the Theory of Solids, Cambridge University Press, London.

M.Sc. in PHYSICS (THIRD SEMESTER)	
COURSE CODE: MSP 302 **COURSE TYPE :** CCC	
COURSE TITLE: NUCLEAR AND PARTICLE PHYSICS	
CREDIT: 08 **THEORY:** 06 **PRACTICAL:** 02	**HOURS:** 135 **THEORY:** 90 **PRACTICAL:** 45
MARKS: 100 **THEORY:** 70 **CCA :** 30 **PRACTICAL:** 50	
OBJECTIVE: The main objective is to learn nuclear and particle physics .	

UNIT-1 20 Hrs.	Nuclear Structure And Models Magnetic dipole moment - Experimental determination - Electric quadruple moment - Liquid drop model - Semi-empirical mass formula of Weizsacker - Nuclear stability - Mass parabolas - Bohr-Wheeler theory of fission - Shell model - Spin-orbit coupling - Magic numbers - Angular momenta and parities of nuclear ground state - qualitative discussion and estimates of transition rates - Magnetic moments and Schmidt lines - Collective model of Bohr and Mottelson - Nilsson Model - oblate and prolate deformations of Nucleus.
UNIT-2 15 Hrs	Nuclear Interactions Nuclear forces - Two body problem - Ground state of deuteron - Magnetic moment - Quadruple moment - Tensor forces - Meson theory of nuclear forces - Yukawa potential - Nucleon-nucleon scattering - Low energy n-p scattering - Effective range theory - Spin dependence, charge independence and charge symmetry of nuclear forces - Isospin formalism.
UNIT-3 20 Hrs	Nuclear reactions Types of reactions and conservation laws - Energetics of nuclear reactions - Reaction dynamics - Q-value equation - Scattering and reaction cross sections - compound nucleus - Scattering matrix - Reciprocity theorem - Breit-Wigner one level formula - Resonance Scattering - Continuum theory - Optical model - Absorption cross section at high energies.
UNIT-4 20Hrs	Nuclear decay Beta decay - Fermi's theory - Fermi-Kurie Plot - Fermi and Gamow - Teller selection rules - Allowed and forbidden decays - Decay rates - Theory of Neutrino - Helicity of neutrino - Helicity measurement - Theory of electron capture - Non-conservation of parity - Gamma decay - Internal conversion - Multipole transitions in nuclei - Nuclear isomerism - Angular correlation in successive gamma emissions.
UNIT- 5 15 Hrs	Particle Physics Types of interactions between elementary particles - Hadrons and Leptons - Symmetry and conservation laws. Elementary ideas of CP and CPT invariance - Classification of Hadrons - Lie algebra - SU (2) - SU (3) multiplets - Quark model - Gell-mann-Okubo mass formula for octet and decaplet Hadrons - Weak interactions.

LABORATORY WORK MSP312	**CORE PRACTICAL IV :NUCLEAR PHYSICS LAB** 1. To determine half-life of a radio isotope using GM counter. 2. To study absorption of particles and determine range using at least two sources. 3. To study characteristics of a GM counter adn to study statistical nature of radioactive decay. 4. To study spectrum of beta- particles using Gamma ray spectrometer. 5. To calibrate a scintillation spectrometer and determine energy of g-rays from an unknown source. 6. To study Compton scattering of gamma rays and verify the energy shift formula. 7.Study of Rutherford Scattering. 8.Positron annihilation. 9. Study of Beer`s Law. 10. Stefan`s Constant of Radiation – High Resistance by Leakage Method.
SUGGESTED READINGS	1. Y.R. Waghmare, 1981, Introductory Nuclear Physics, Oxford-IBH, New Delhi. 2. Ghoshal, Atomic and Nuclear Physics, Volume 2. 3. J.M. Longo, 1971, Elementary Particles, McGraw-Hill, New York. 4. R.D. Evans, 1955, Atomic Nucleus, McGraw-Hill, New York. 5. B.L. Cohen, 1971, Concepts of Nuclear Physics, TMH, New Delhi. 6. M.K. Pal, 1982, Theory of Nuclear Structure, Affl. East-West, Chennai. 7. W.E. Burcham and M. Jobes, 1995, Nuclear and Particle Physics, Addison-Wesley, Tokyo.

M.Sc. in PHYSICS (THIRD SEMESTER)	
COURSE CODE: MSP 303 **COURSE TYPE :** CCC	
COURSE TITLE: CLASSICAL ELECTRODYNAMICS	
CREDIT: 06 **THEORY:** 06	**HOURS:** 90 **THEORY:** 90
MARKS: 100 **THEORY:** 70 **CCA :** 30	
OBJECTIVE: The main objective is to learn classical electrodynamics .	
UNIT-1 15 Hrs.	Electrostatics: Electric field, Gauss Law, Differential form of Gaussian law. Another equation of electrostatics and the scalar potential, surface distribution of charges and dipoles and discontinuities in the electric field and potential, Poisson and Laplace equations, Green's Theorem, Uniqueness of the solution with the Dirichlet or Neumann boundary Conditions, Formal Solutions of electrostatic Boundary value problem with Green's function, Electrostatic potential energy and energy density, capacitance.
UNIT-2 20 Hrs	Boundary Value Problems in Electrostatics: Methods of Images, Point charge in the presence of a grounded conducting sphere, point charge in the presence of a charged insulated conducting sphere, point charge near a conducting sphere at a fixed potential, conducting sphere in a uniform electric field by method of images, Green function for the sphere, General solution for the potential, conducting sphere wit hemispheres at a different potentials. orthogonal functions and expansion.
UNIT-3 20 Hrs	Magnetostatics: Introduction and definition, Biot and Savart Law, the differential equations of magnetostatics and Ampere's law, Vector potential and magnetic induction for a current loop, Magnetic fields of a localized current distribution, Magnetic moment, Force and torque on and energy of a localized current distribution in an external induction, Macroscopic equations, Boundary conditions on B and H Methods of solving Boundary value Problems in magnetostatics, Uniformly magnetized sphere, magnetized sphere in an external fields, permanent magnets, magnetic shielding, spherical shell of permeable material in an uniform field
UNIT-4 20Hrs	Time varying fields, Maxwell's equations conservation laws: Energy in a magnetic field, vector and scalar potentials, Gauge transformations, Lorentz gauge, Coulomb gauge, Green function for the wave equation, Derivation of the equations of Macroscopic Electromagnetism,

UNIT-5 15 Hrs	Poynting's Theorem and conservation of energy and momentum for a system of charged particles and EM fields. Conservation laws for macroscopic media. Electromagnetic field tensor, transformation of four potentials and four currents, tensor dissipation of Maxwell's equations.
SUGGESTED READINGS	1. J.D. Jackson: Classical Electrodynamics 2. Panofsky & Phillip: Classical electrodynamics and magnetism 3. Griffith: Introduction to Electrodynamics 4. Landau & Lifshitz: Classical Theory of Electrodynamics 5. Landau & Lifshitz: Electrodynamics of continuous media

M.Sc. in PHYSICS (THIRD SEMESTER)	
COURSE CODE: MSPS02	**COURSE TYPE : OSC**
COURSE TITLE:INTELLECTUAL PROPERTY RIGHTS, HUMAN RIGHTS & ENVIRONMENT: BASICS	
CREDIT: 06 **THEORY: 06**	**HOURS : 90** **THEORY: 90**
MARKS : 100 **THEORY: 70 CCA : 30**	

OBJECTIVE:

- Understands the concept and place of research in concerned subject
- Gets acquainted with various resources for research
- Becomes familiar with various tools of research
- Gets conversant with sampling techniques, methods of research and techniques of analysis of data.

UNIT - 1 **12 Hrs**	• Patents :- Introduction & concepts, Historical Overview. • Subject matter of patent. • Kinds of Patents. • Development of Law of Patents through international treaties and conventions including TRIPS Agreement. • Procedure for grant of patents & term of Patent. • Surrender, revocation and restoration of patent. • Rights and obligations of Patentee • Grant of compulsory licenses • Infringement of Patent and legal remedies • Offences and penalties • Discussion on leading cases.
UNIT - 2 **24 Hrs**	• Meaning of Copyright, Historical Evolution, • Subject matter of copyright. • Literary works • Dramatic Works & Musical Works • Computer Programme • Cinematographic films • Registration of Copyrights • Term of Copyright and Ownership of Copyrights • Neighboring Rights • Rights of Performers & Broadcasters • Assignment of Copyright. • Author's Special Rights (Moral Rights) • Infringement of Copyrights and defenses • Remedies against infringement (Jurisdiction of Courts and penalties) • International Conventions including TRIPS Agreement WIPO, UCC, Paris Union, Berne Convention, UNESCO. • Discussion on leading cases.
UNIT - 3 **10 H rs**	• Rights: Meaning • Human Rights- Meaning & Essentials • Human Rights Kinds • Rights related to Life, Liberty, Equals & Disable

UNIT - 4 24 Hrs	• National Human Rights Commission • State Human Rights Commission • High Court • Regional Court • Procedure & Functions of High & Regional Court.
UNIT - 5 20 Hrs	• Right to Environment as Human Right • International Humanitarian Law and Environment • Environment and Conflict Management • Nature and Origin of International Environmental Organisations (IEOs) • Introduction to Sustainable Development and Environment • Sustainable Development and Environmental Governance
SUGGESTED READINGS	1. G.B.Reddy, *Intellectual Property Rights and Law,* Gogia Law Agency, Hyderabad. 2. S.R.Myneni, *Intellectual Property Law*, Eastern Law House, Calcutta 3. P Narayanan *Intellectual Property Rights and Law (1999)*, Eastern Law House, Calcutta, India 4. Vikas Vashistha, *Law and Practice of Intellectual Property*,(1999) Bharat Law House, New Delhi. 5. Comish W.R *Intellectual Property,3rd ed. (1996),* Sweet and Maxwell 6. P.S. Sangal and Kishor Singh, *Indian Patent System and Paris Convention,* 7. Comish W.R *Intellectual Property, Patents, Copyrights and Allied Rights, (2005)* 8. Bibeck Debroy, *Intellectual Property Rights, (1998),* Rajiv Gandhi Foundation.

M.Sc. in PHYSICS
(THIRD SEMESTER)

COURSE CODE: MSPC01 **COURSE TYPE : ECC/CB**

COURSE TITLE:TRIBAL STUDIES

CREDIT: 06	**HOURS : 90**
THEORY: 06	**THEORY: 90**

MARKS : 100
THEORY: 70 **CCA : 30**

OBJECTIVE:

- Understands the concept and place of research in concerned subject
- Gets acquainted with various resources for research
- Becomes familiar with various tools of research
- Gets conversant with sampling techniques, methods of research and techniques of analysis of data
- Achieves skills in various research writings
- Gets acquainted with computer Fundamentals and Office Software Package .

UNIT - 1 12 Hrs	**Tribal Studies :** Meaning, Nature, Scope, Need & importance of tribalstudies. Meaning, Definition & characteristics of Tribe, Caste & Race.
UNIT - 2 24 Hrs	**Scheduled Tribe in India :** Population Composition of tribal, classification of Indian Tribe – Racial, Lingual, Geographical, Cultural. **Some Major Tribes in India :** Santhal, Khasi, Munda, Bhils. **Some Major Tribes in Central India :** Gond, Baiga, Bharia, Korkus.
UNIT - 3 10 H rs	**Iliteracy :**Poverty, Indebness, Unemployment, migration & ExploitationEnvironmental & Degradation. **Problem of Health and sanitation :** Prostitution, Culture Decay due to assimilation. Replacement & Rehabilitation of Tribal population.
UNIT - 4 24 Hrs	**Welfare-Concept, Characteristics:** Tribal Welfare in post independenceperiod. Constitutional provision & safe guard after independence, Legislation & Reservation Policy.
UNIT - 5 20 Hrs	**Tribal Development Programs for Scheduled Tribes :** Medical, Education, Economy, Employment & Agriculture Evaluation of Programs **Tribal Welfare & Advisory Agencies in India :** Role of NGO's in tribal development, Role of Christian missionaries in tribal welfare & development. Tribal Welfare Administration.
SUGGESTED READINGS	1. *Tribal Development In India (Orissa)* by Dr. Taradutt 2. *Books on Tribal studies* by PK Bhowmik 3. *Books on 'Tribal Studies'* by W.G. Archer

M.Sc. in PHYSICS (THIRD SEMESTER)	
COURSE CODE: MSP C02 **COURSE TYPE : ECC/CB**	
COURSE TITLE: MICROWAVE ELECTRONICS	
CREDIT: 06 **THEORY: 06**	**HOURS : 90** **THEORY: 90**
MARKS : 100 **THEORY: 70 CCA : 30**	
OBJECTIVE: The main objective is to learn microwave electronics .	
UNIT-1 20Hrs.	Waveguides and components: Field distribution in rectangular waveguide in TE and TM modes, Phase velocity, Group velocity, Characteristics impedance, wall current, Cavity resonators and their excitation techniques, Scattering matrix for Microwave Tees and hybrid junction directional coupler, Construction and working of precision attenuator and phase shifter.
UNIT-2 20Hrs	CIRCUIT THEORY OF WAVE GUIDES: Power Transmission in Wave Guides, Equivalent Voltages and Currents, Impedance Description of Wave Guide Elements and Circuits, Foster's Reaction Theorem, One Port Circuits, N-Ports Circuits, Scattering Matrix Formulation, Excitation and Coupling of Wave Guides, Dielectric Loaded Wave Guides, Surface Wave Guides.
UNIT-3 20 Hrs	ANTENNAS: Familiarity with Different Types of Antennas, Radiation Properties, Strip-Lines and Microstrip Lines, Strip-Line Characteristics, Strip-Line Components, Microstrip Antennas, Radiation Properties of Microstrip Antennas
UNIT-4 15 Hrs	APPLICATIONS OF MICROWAVES: Applications of Microwave in RADAR, Satellite Communication, Mobile Communication, Microwave Heating
UNIT-5 15 Hrs	FERRITES Microwave Propagation in Ferrites, Nano Ferrites, Synthesis of Nano Ferrites, Dielectric Properties of Ferrites, Ferrites as Microwave Absorbers.
SUGGESTED READINGS	1. Foundations for Microwave Engineering: R.E. Collins, Mc. Graw Hills 2. Solid State Electronic Devices: B. Streetman and S.K. Banerjee, PHI 3. Microwave Devices and Circuits: L.S.Y. Liao, PHI 4. Antenna Theory and Design: C.A. Balanis, John Wiley & Sons 5. Basic Microwave Techniques and Laboratory Manual: M. L. Sisodia, G. S. Raghuvanshi. New Age International, Jan 1, 1987

M.Sc. in PHYSICS (THIRD SEMESTER)	
COURSE CODE: MSPC03 **COURSE TYPE : ECC/CB**	
COURSE TITLE: NANO SCIENCE	
CREDIT: 06 **THEORY: 06**	**HOURS : 90** **THEORY: 90**
MARKS : 100 **THEORY: 70 CCA : 30**	
OBJECTIVE: The main objective is to learn Nano Science .	
UNIT-1 20Hrs.	Introduction to Nanoparticles Introduction - Historical perspective of nanoparticle - Classification of nanomaterials - Nanorods - Nanoparticle - Nanomaterial preparation - Plasma arching - Chemical vapour deposition - Solgel electrodeposition - Ball milling technique.
UNIT-2 20Hrs	Nanocrystals Synthesis of metal nanoparticles and structures - Background on quantum semiconductors - Background on reverse Miceller solution - Synthesis of semiconductors - Cadmium telluroid nano crystals - Cadmium sulfide nano crystals - Silver sulfide nano crystals - Nano manipulator - Nano tweezes - Nanodots.
UNIT-3 20 Hrs	Characteristics of Nanomaterials Magnetism in particle of reduced size dimension - Variation of magnetism with size - Magnetic behavior of small particle - Diluted magnetic semiconductor (DMS) - Fe DME and its applications. Nanoparticle as chemical reagents - Specific heat of nanoparticle crystals - Melting point of Nanoparticle material - Nanolithography - Estimation of nanoparticle size using AFM.
UNIT-4 15 Hrs	Nano Tubes New form of carbon - Types of nanotubes - Formation of nanotubes - Various techniques - Preparation and properties of nanotubes - Uses of nanotubes and applications - Nano material processing for nanotube - Light and Nano technology - Nanoholes and photons - Quantum electronic devices - Quantum electronic devices - Quantum information and Quantum Computers.

UNIT-5 15 Hrs	Applications Micromechanical systems - Robots - Ageless materials - Nanomechanics - Nano electronics - Optoelectronic devices - LED - Applications - Colourants and pigments - Nano biotechnology - DNA chips - DNA array devices - Drag delivery systems.
SUGGESTED READINGS	1. NANOSCIENCE AND NANO TECHNOLOGY : FRONTIERSOF FUNDAMENTALS BY : M.S. RAMCHANDRA RAO . 2. NANO : THE ESSENTIALS . BY : T. PRADEEP

M.Sc. in PHYSICS (THIRD SEMESTER)	
COURSE CODE: MSP C04 **COURSE TYPE : ECC/CB**	
COURSE TITLE: HIGH ENERGY PHYSICS - III	
CREDIT: 06 **THEORY: 06**	**HOURS : 90** **THEORY: 90**
MARKS : 100 **THEORY: 70 CCA : 30**	
OBJECTIVE: The main objective is to learn High Energy Physics .	
UNIT-1 20Hrs.	Local gauge invariance and Yang-Mills fields, Lagrangian of the Spontaneous symmetry breaking and the Higgs mechanism, The Weinberg-Salam model and beyond.
UNIT-2 20Hrs	Unified models of weak and electromagnetic interactions, Standard Model, flavor group, flavor-changing neutral currents. Weak isospin.
UNIT-3 20 H rs	Quark and lepton mixing. CP violation. Neutrino oscillations.
UNIT-4 15 Hrs	CKM quark mixing matrix, GIM mechanism, rare processes, neutrino masses, seesaw mechanism
UNIT-5 15 Hrs	QCD confinement and chiral symmetry breaking, instantons, strong CP problem.
SUGGESTED READINGS	1. Francis Halzen and Allan D. Martin, Quarks and Leptons: An Introductory Course in Modern Particle Physics, John Wiley and Sons 2. B.R. Martin and G. Shaw, Particle Physics, 2nd edition, J. Wiley and Sons (1997). 3. Particle Data Group, The Review of Particle Physics, 4. David Griffiths, Introduction to Elementary Particles 5. Donald Perkin, Introduction to high energy physics.

2 DEPARTMENT OF PHYSICS

- **M. Sc. in PHYSICS** **FACULTY OF SCIENCE**
- **SECOND SEMESTER** (EVEN SEMESTER)

Eligibility Criteria (Qualifying Exams)	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
After appearing in the first semester examination irrespective of any number of back/ arrear papers	MSP 201	CCC	Electronics	6	4	3	00	3	0
	MSP 211	CCC	Electronics Lab	6	00	00	9	0	3
	MSP 202	CCC	Atomic and Molecular Physics	6	4	3	00	3	0
	MSP 203	CCC	Quantum Mechanics II	6	4	3	00	3	0
	MSP 221	PRJ/FST/EST	Social Outreach and Skill Development	6	00	00	9	00	4
	MSP B01	ECC/CB	Environmental and Forest Laws	6	4	3	00	3	00
	MSP B02	ECC/CB	Electronic Instrumentation						
	MSP B03	ECC/CB	Condensed Matter - II						
	MSP B04	ECC/CB	High Energy Physics - II						
				TOTAL= 36					

M.Sc. in PHYSICS (SECOND SEMESTER)			
COURSE CODE:	**MSP 201**	**COURSE TYPE :**	**CCC**
COURSE TITLE:	**ELECTRONICS**		
CREDIT: 06 **THEORY: 06**	**PRACTICAL: 00**	**HOURS: 90** **THEORY: 90**	**PRACTICAL: 00**
MARKS: 100 **THEORY: 70**	**CCA : 30**	**PRACTICAL: 00**	
OBJECTIVE: The main objective is to learn about Electronics and it's basic concepts .			
UNIT-1 20 Hrs.	Operational Amplifiers: Differential amplifier - circuit configurations - dual input, balanced output differential amplifier, DC analysis, inverting and non-inverting inputs, CMRR-constant current bias level translator. Block diagram of typical OP-Amp analysis. Open loop configuration, inverting and non-inverting amplifiers, Op-Amp with negative feedback, voltage series feedback, effect of feed back on closed loop gain, input resistance, bandwidth and output offset voltage, voltage follower. Practical Op-Amp, input offset voltage-input bias current-input offset current, total output offset voltage, CMRR frequency response. DC and AC amplifier. integrator and differentiator.		
UNIT-2 15 Hrs	Oscillators: Oscillator Principle, Frequency stability response, the phase shift oscillator, Wein bridge oscillator, LC tunable oscillators.		
UNIT-3 15 Hrs	Wave Shaping Circuits : Multivibrators- Monostable, astable and bistable, Comparators, Square wave and triangle wave generation, clamping and clipping circuits.		
UNIT-4 20Hrs	Digital Electronics: Combinational logic: Standard representations for logic functions, Karnaugh Map Representation of logical functions, Simplification of logical functions using K-Map, Minimization of Logical functions specified in Minterms / Maxterms or truth table, Don't care conditions, Adder (half and full), Subtractor (half and full), comparator, Multiplexers and their uses, Demultiplexer / Decoders and their uses, BCD arithmatics, Parity generators / Checkers, Code Converters, Priority Encoders, Decoder / Drivers for display devices, Seven Segment display device. ROM, Programmable Logic Array. Basic concepts about fabrication and characteristics of integrated circuits.		

UNIT-5 20Hrs	Sequential Logic: Flip-Flops: one - bit memory, RS, JK, JK master slave, T and D type flip flops, shift resisters - synchronous and asynchronous counters, cascade counters, Binary counter, Decade counter. A/D and D/A conversion- Basic principles, circuitry and simple applications. Voltage regulators - fixed regulators, adjustable voltage regulators, switching regulators. Basic idea of IC 555 and its applications as multivibrator and sqaure wave generator. Opto-electronic Devices: Photo diode, Phototransistor, Light emitting Diode and their applications
SUGGESTED READINGS	1. "Electronic Devices and Circuit Theory" by Robert Boylested and Louis Nashdsky, PHI, New Delhi - 110001, 1991. 2. "OP-AMP and Linear Integrated Circuits" by Ramakanth, A. Gayakwad, PHI, Second Edition 1991. 3. "Digital Principle and Applications" by A.P. Malvino and Donald P. Leach, Tata McGraw Hill Company, New Delhi, 1993.

M.Sc. in PHYSICS (SECOND SEMESTER)	
COURSE CODE: MSP 211 **COURSE TYPE :** CCC	
COURSE TITLE: ELECTRONICS LAB	
CREDIT: 06 **THEORY:** 00 **PRACTICAL:** 06	**HOURS:** 135 **THEORY:** 00 **PRACTICAL:** 135
MARKS: 100 **PRACTICAL:** 100	

LABORATORWORK MSP211

ELECTRONICS LAB

1.Characteristics of SCR and Triac.

2. SCR and Triac - Switching and power control.

3. Op-amp - Inverting, Non-inverting amplifier - Voltage follower - summing, difference, average amplifier - differentiator and integrator.

4. Op-amp - Study of the attenuation characteristics and design of the phase-shift Oscillator.

5. Op-amp - Study of the attenuation characteristics and design of the Wien Bridge Oscillator.

6. Op-amp - Solving simultaneous equations

7. Op-amp - Design of square wave, sawtooth wave, and Triangular wave generators.

8. Op-amp - Design of schmitt Trigger and construction of Monostable multivibrator.

9. Op-amp - Design of active filters - second order - low pass, high pass, band pass and band rejecter.

10. Op-amp - D.A. converter - Binary weighted method - R/2R ladder method.

11. IC 7400 - Half adder, Half subtractor, Full adder, Full subtractor.

12. IC 7490 - modulus counters

13.IC 741- OP-AMP

M.Sc. in PHYSICS (SECOND SEMESTER)	
COURSE CODE: MSP 202 **COURSE TYPE : CCC**	
COURSE TITLE: ATOMIC AND MOLECULAR PHYSICS	
CREDIT: 06 **THEORY: 06 PRACTICAL: 00**	**HOURS: 90** **THEORY: 90 PRACTICAL: 00**
MARKS: 100 **THEORY: 70 CCA : 30 PRACTICAL: 00**	
OBJECTIVE: The main objective is to learn about atomic and molecular physics . .	
UNIT-1 20 Hrs.	Gross structure of energy spectrum of hydrogen atom. Non degenerate first order perturbation method, relativistic correction to energy levels of an atom, atom in a weak uniform external electric field – first and second order Stark effect, calculation of the polarizability of the ground state of hydrogen atom and of an isotropic harmonic oscillator
UNIT-2 15 Hrs	Degenerate stationary state perturbation theory, linear Stark effect for hydrogen atom levels, inclusion of spin orbit interaction and weak magnetic field, Zeeman effect, effect of strong magnetic field. Magnetic dipole interaction, hyperfine structure and Lamb shift (only qualitative description).
UNIT-3 20 Hrs	Indistinguishability and exchange symmetry, many particle wave functions and Pauli's exclusion principle, spectroscopic terms for atoms.The helium atom, Variational method and its use in calculation of ground state energy. Hydrogen molecule, Heitler London method for hydrogen molecule. WKB method for one dimensional problem, application to bound states (Bohr Sommerfeld quantization) and the barrier penetration.
UNIT-4 20Hrs	Spectroscopy (qualitative):General features of the spectra of one and two electron system – singlet, doublet and triplet characters of emission spectra, general features of alkali spectra. Rotation and vibration band spectrum of a molecule, P,Q and R branches. Raman spectra for rotational and vibrational transitions, comparison with infrared spectra – application to learning about molecular symmetry. General features of electronic spectra, Frank and Condon's principle.

UNIT- 5 15Hrs	Laser cooling and trapping of atoms: The scattering force, slowing an atomic beam, chirp cooling, optical molasses technique, Doppler cooling limit, magneto optical trap. Introduction to the dipole force, theory of the dipole force, optical lattice. Sisyphus cooling technique – description and its limit. Atomic fountain. Magnetic trap (only qualitative description) for confining low temperature atoms produced by Laser cooling, Bose-Einstein condensation in trapped atomic vapours, the scattering length, Bose-Einstein condensate, coherence of a Bose-Einstein Condensate, The Atom Laser.
SUGGESTED READINGS	1. G. Banewell – Atomic and Molecular spectroscopy 2. Christopher J. Foot – Atomic Physics, Oxford Master series, 2005 3. G.K. Woodgate, Elementray Atomic Structure, Second Edition Clarendon Press, Oxford. 4. T.A. Littlefield - Atomic and Molecular Physics. 5. Eistaberg and Rasmic- Quantum Physics of Atoms. Molecules Solids and Nuclear Particles. 6. Ashok Das and A.C. Melfessions. Quantum Mechanics ; A Modem Approach (Gordon and Breach Science Publishers). 7. White - Atomic Spectra. 8. Herzberg- Molecular spectra.

M.Sc. in PHYSICS (SECOND SEMESTER)	
COURSE CODE: MSP 203 **COURSE TYPE : CCC**	
COURSE TITLE: QUANTUM MECHANICS II	
CREDIT: 06 **THEORY: 06 PRACTICAL: 00**	**HOURS: 90** **THEORY: 90**
MARKS: 100 **THEORY: 70 CCA : 30**	
OBJECTIVE: The main objective is to learn about quantum mechanics .	
UNIT-1 20 Hrs.	Scattering Theory The scattering problem - formulation - Scattering amplitude - cross sections - Transformation from centre of mass to laboratory frame- Partial wave analysis - optical theorem - Phase shifts - Scattering length and effective range - Low energy scattering - Born approximation and its validity.
UNIT-2 15 Hrs	Perturbation Theory Time dependent perturbation theory - Constant and harmonic perturbations - Transition probabilities - Fermi's-Golden rule - Selection rules for dipole radiation - Adiabatic approximation - Sudden approximation - The density matrix - spin density matrix and magnetic resonance - Semi classical treatment of an atom with electromagnetic radiation.
UNIT-3 20 Hrs	Relativistic Quantum Mechanism Klein-Gordon equation - Failures - Dirac equation - Plane - wave solutions - Interpretation of negative energy states - Antiparticles - Spin of electron - Magnetic moment of an electron due to spin - Energy values in a coulomb potential.
UNIT-4 20Hrs	Dirac equation Covariant form of Dirac equation - properties of gamma matrices - Traces - Separation of the equation and the Hydrogen atom problem - Invariance of Dirac equation under Lorentz transformation - T-Transformation for the Dirac equation in presence of electro magnetic field.

UNIT-5 15 Hrs	Quantisation of Fields Relativistic Lagrangian and Hamiltonian of a charged particle in an electromagnetic field - The Lagrangian and Hamiltonian formulations of field - Second quantization of Kelin-Gordon field - creation and annihilation operators - Commutation relations - Quantization of electromagenetic field - Quantization of Schroedinger's field - Quantization of Dirac field.
SUGGESTED READINGS	1. Ashok Das and A.C. Milissiones : Quantum mechanics - A Modern Approach, Garden and Breach Science Publishers. 2. J.J. Sakurai : Advanced Quantum Mechanics (John Wiley) 3. E. Merzbacher, 1970, Quantum Mechanics, 2nd Edition, John Wiley and Sons, New York. 4. J.D. Bjorken and S.D. Drell, 1964, Relativistic Quantum Mechanics, McGraw-Hill, New York. 5. V.K. Thankappan, 1985, Quantum Mechanics, 2nd Edition, Wiley Eastern Ltd, New Delhi. 6. L.D. Landau and E.M. Lifshitz, 1958 Quantum Mechanics, Pergomon Press, London. 7. G. Aruldhas, 2002, Quantum Mechanics, Prentice-Hall of India, New Delhi.

M.Sc. in PHYSICS (SECOND SEMESTER)	
COURSE CODE : MSPB01	**COURSE TYPE : ECC/CB**
COURSE TITLE: ENVIRONMENTALAND FOREST LAWS	
CREDIT: 06 **THEORY: 06**	**HOURS : 90** **THEORY: 90**
MARKS : 100 **THEORY: 70 CCA : 30**	

OBJECTIVE:

- Understands the concept and place of research in concerned subject
- Gets acquainted with various resources for research
- Becomes familiar with various tools of research
- Gets conversant with sampling techniques, methods of research and techniques of analysis of data
- Achieves skills in various research writings
- Gets acquainted with computer Fundamentals and Office Software Package .

UNIT - 1 18 Hrs

EVOLUTION OF FOREST AND WILD LIFE LAWS

a) Importance of Forest and Wildlife
b) Evolution of Forest and Wild Life Laws
c) Forest Policy during British Regime
d) Forest Policies after Independence.
e) Methods of Forest and Wildlife Conservation.

UNIT - 2 18 Hrs

FOREST PROTECTION AND LAW

a) Indian Forest Act, 1927
b) Forest Conservation Act, 1980 & Rules therein
c) Rights of Forest Dwellers and Tribal
c) The Forest Rights Act, 2006
d) National Forest Policy 1988

UNIT - 3 18 H rs

WILDLIFE PROTECTION AND LAW

a) Wild Life Protection Act, 1972
b) Wild Life Conservation strategy and Projects
c) The National Zoo Policy

UNIT - 4 18 Hrs	**CHAPTER – BASIC CONCEPTS** a. Meaning and definition of environment. b. Multidisciplinary nature of environment c. Concept of ecology and ecosystem d. Importance of environment e. Meaning and types of environmental pollution. f Factors responsible for environmental degradation. **CHAPTER– INTRODUCTION TO LEGAL SYSTEM** a. Acts, Rules, Policies, Notification, circulars etc b. Constitutional provisions on Environment Protection c. Judicial review, precedents d. Writ petitions, PIL and Judicial Activism **CHAPTER – LEGISLATIVE FRAMEWORK FOR POLLUTION CONTROL LAWS** a) Air Pollution and Law. b) Water Pollution and Law. c) Noise Pollution and Law.
UNIT - 5 18 Hrs	**CHAPTER- LEGISLATIVE FRAMEWORK FOR ENVIRONMENT PROTECTION** a) Environment Protection Act & rules there under b) Hazardous Waste and Law c) Principles of Strict and absolute Liability. d) Public Liability Insurance Act e) Environment Impact Assessment Regulations in India **CHAPTER – ENVIRONMENTAL CONSTITUTIONALISM** a. Fundamental Rights and Environment i) Right to Equality …….Article 14 ii) Right to Information ……Article 19 iii) Right to Life ……..Article 21 iv) Freedom of Trade vis-à-vis Environment Protection b. The Forty-Second Amendment Act c. Directive Principles of State Policy & Fundamental Duties d. Judicial Activism and PIL

SUGGESTED READINGS

Bharucha, Erach. Text Book of Environmental Studies. Hyderabad : University Press (India) Private limited, 2005.

Doabia, T. S. Environmental and Pollution Laws in India. New Delhi: Wadhwa and Company, 2005.

Joseph, Benny. Environmental Studies, New Delhi: Tata McGraw-Hill Publishing Company Limited, 2006.

Khan. I. A, Text Book of Environmental Laws.Allahabad: Central Law Agency, 2002.

Leelakrishnan, P. Environmental Law Case Book. 2nd Edition. New Delhi: LexisNexis Butterworths, 2006.

Leelakrishnan, P. Environmental Law in India. 2nd Edition. New Delhi: LexisNexis Butterworths, 2005.

Shastri, S.C (ed). Human Rights, Development and Environmental Law, An Anthology. Jaipur: Bharat law Publications, 2006.

Environmental Pollution by Asthana and Asthana, S,Chand Publication

Environmental Science by Dr. S.R.Myneni, Asia law House

Gurdip Singh, Environmental Law in India (2005) Macmillan.

Shyam Diwan and Armin Rosencranz, Environmental Law and Policy in India – Cases, Materials and Statutes (2nd ed., 2001) Oxford University Press.

JOURNALS :-

Journal of Indian Law Institute, ILI New Delhi.

Journal of Environmental Law, NLSIU, Bangalore.

MAGAZINES :-

Economical and Political Weekly

Down to Earth.

M.Sc. in PHYSICS (SECOND SEMESTER)	
COURSE CODE: MSP B02 **COURSE TYPE : ECC/CB**	
COURSE TITLE: ELECTRONIC INSTRUMENTATION	
CREDIT: 06 **THEORY: 06**	**HOURS : 90** **THEORY: 90**
MARKS : 100 **THEORY: 70 CCA : 30**	
OBJECTIVE: The main objective is to learn about electronic instrumentation .	
UNIT-1 20Hrs.	Transducers : Classification of Transducers - Principle, construction and working of Thermistor, LVDT, Electrical strain gauges and capacitive transducers. Measurement of non-electrical quantities - Strain, Displacement, temperature, Pressure and Force.
UNIT-2 20 Hrs	Digital Instrumentation : Principle, block diagram and working of Digital frequency counter, digital multimeter, digital pH meter, digital conductivity meter and digital storage oscilloscope.
UNIT-3 20 H rs	Analytical Instrumentation : Principle, block diagram, description, working and applications of UV-VIS spectrometer, IR spectrometer, Flame emission spectrometer and ICP - AES spectrometer - Basic concepts of Gas and Liquid Chromatography.
UNIT4 15 Hrs	Bio-Medical Instrumentation : Physiological transducers to measure blood pressure, body temperature. Sources of Bio-electric potentials - resting potential, action potential, bio-potential electrodes. Principle, block diagram and operation of ECG and EEG - recorders.
UNIT-5 15 Hrs	Computer Peripherals : Printers - Printer mechanism - Classification. Dot matrix, Ink jet and laser printers. Basic concepts of key board and mouse. Mass data storage - floppy disk -Hard Disk - Optical disk (CD).

SUGGESTED READINGS	1. Dr. Rajendra Prasad, Electronic Measurements and Instrumentation, Khanna Publications. 2. S. Ramambhadran, Electronic Measurements and Instrumentation Khanna Publications. 3. S.M. Dhir, Electronics and Instrumentation, Khanna Publishers. Khandpur

M.Sc. in PHYSICS (SECOND SEMESTER)	
COURSE CODE: MSP B03	**COURSE TYPE : ECC/CB**
COURSE TITLE: CONDENSED MATTER PHYSICS - II	
CREDIT: 06 **THEORY: 06**	**HOURS : 90** **THEORY: 90**
MARKS : 100 **THEORY: 70**	**CCA : 30**
OBJECTIVE: The main objective is to learn about condensed matter physics .	

UNIT-1 20Hrs.	Disordered systems: Substitutional, positional and topographical disorder, short and long range order, glass transition, glass forming ability, nucleation and growth processes. Anderson model for random system and electron localization, mobility and hopping conduction. Metal glasses, models for structure of metal glasses. Structure factor for binary metallic glasses and its relationship with radial distribution function. Discussion of electric, magnetic and mechanical properties of glassy systems. Point defects: shallow impurity states in semiconductors. Localized lattice vibrational states in solids. Vacancies, interstitials and colour centres in ionic crystals.
UNIT-2 20 Hrs	Nanomaterials: Free electron theory (qualitative idea), variation of density of states with energy, variation of density of state and band gap with size of crystal. Electron confinement in infinitely deep square well, confinement in two and one dimensional well, idea of quantum well structure , tunneling through potential barrier, quantum dots, quantum wires.

UNIT-3 20 Hrs	Different methods of preparation of nanomaterials. Sol-gel and chemical co-precipitation method, effect of temperature on the size of the particles. Bottom up: cluster beam evaporation, ion beam deposition, top down: ball milling. DC and RF sputtering.
UNIT4 15 Hrs	Films and surfaces: Study of surface topography by multiple beam interferometry, conditions for accurate determination of step height and film thicknesses (Fizeau fringes). Electrical conductivity of thin films, difference of behaviour of thin films from bulk material, Boltzman transport equation for a thin film (for diffuse scattering), expression for electrical conductivity for thin film. Enhancement of magnetic anisotropy due to surface pinning.
UNIT-5 15 Hrs	Experimental techniques: Basic ideas of the techniques of field emission, scanning tunnelling and atomic force microscopy, scanning electron microscopy, transmission electron microscopy, X-ray diffraction line broadening, small angle X-ray scattering and small angle neutron scattering.
SUGGESTED READINGS	1.Tolansky: Multiple beam interferometry 2. Heavens: Thin films 3.Chopra: Physics of thin films 4. Quantum dot heterostructures: D. Bimerg, M. Grundmann and N.N. Ledenstov, John Wiley & Sons, 1998 5. Nano particles and nano structured films – preparation, characterization and applications, Ed. J.H. Fendler, John Wiley & Sons, 1998. 6. Physics of low dimensional semiconductors: John H. Davies, Cambridge Univ. Press, 1997 7. Physics of semiconductor nano structures: K.P. Jain, Narosa, 1997

M.Sc. in PHYSICS (SECOND SEMESTER)	
COURSE CODE: MSP B04 **COURSE TYPE** : ECC/CB	
COURSE TITLE: HIGH ENERGY PHYSICS - II	
CREDIT: 06 **THEORY:** 06	**HOURS :** 90 **THEORY:** 90
MARKS : 100 **THEORY:** 70 **CCA :** 30	
OBJECTIVE: The main objective is to learn about high energy physics .	
UNIT-1 20Hrs.	Moller scattering, trace theorems and properties of gamma matrices, helicity representation at high energies., the electron propagator, the photon propagator.
UNIT-2 20 Hrs	Structure of Hadrons: form factors, e-p scattering, inelastic e-p scattering, Bjorken scaling, Partons, gluons, deep inelastic scattering, evolution equations for parton densities.
UNIT-3 20 H rs	QCD: Electron positron annihilation into hadrons, heavy qwuark production, three jet events, QCD corrections, Perturbative QCD, Drell-Yan process
UNIT4 15 Hrs	Weak Interactions: Parity violation, V-A form of weak interaction, Nuclear beta decay, muon decay, pion decay, neutrino electron scattering, neutrino quark scattering, weak neutral currents, the Cabibo angle, weak mixing angles, CP invariance.
UNIT-5 15 Hrs	Gauge Symmetries: U(1) Local gauge invariance and QED, Non-abelian gauge invariance and QCD, massive gauge bosons, spontaneous breakdown of symmetry, the Higgs mechanism.
SUGGESTED READINGS	1. Francis Halzen and Allan D. Martin, Quarks and Leptons: An Introductory Course in Modern Particle Physics, John Wiley and Sons 2. B.R. Martin and G. Shaw, Particle Physics, 2nd edition, J. Wiley and Sons (1997). 3. David Griffiths, Introduction to Elementary Particles 4. Byron Roe Particle Physics at the New Millennium 5. Donald Perkin, Introduction to high energy physics).

2 DEPARTMENT OF PHYSICS

- **M. Sc. in PHYSICS**: **FACULTY OF SCIENCE**
- **FIRST SEMESTER** (ODD SEMESTER)

Eligibility Criteria (Qualifying Exams)	Admission Criteria	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)	
						L	T	P	Thy	P
Bachelor Degree in the concerned subject/ discipline	1) Merit List 2) Entrance Test (written or/and oral) if decided by the University 3) Observance of Reservation Policy.	MSP 101	CCC	Mathematical Physics	6	4	3	00	3	0
		MSP 111	CCC	General Experiments	6	00	00	9	0	3
		MSP 102	CCC	Classical Mechanics	6	4	3	00	3	0
		MSP 103	CCC	Quantum Mechanics I	6	4	3	00	3	0
		MSP S01	OSC	Research methodology &computer Application: basics	6	4	3	00	3	00
		MSP A01	ECC/CB	Constitutionalism &Indian Political System	6	4	3	00	3	00
		MSP A02	ECC/CB	Electronic Devices and Applications						
		MSP A03	ECC/CB	Condensed Matter Physics - I						
		MSP A04	ECC/CB	High Energy Physics - I						
					TOTAL= 36					

M.Sc. in PHYSICS (FIRST SEMESTER)			
COURSE CODE: MSP 101		**COURSE TYPE :** CCC	
COURSE TITLE: MATHEMATICAL PHYSICS			
CREDIT: 06 **THEORY:** 06 **PRACTICAL:** 00		**HOURS:** 90 **THEORY:** 90 **PRACTICAL:** 00	
MARKS: 100 **THEORY:** 70	**CCA :** 30	**PRACTICAL:** 00	
OBJECTIVE: The main objective is to learn about Mathematical Physics .			

UNIT-1 15 Hrs.	Complex Variables Analytic function - kinds of singularity - Line integrals and Cauchy's theorem - Taylor and Laurent expansions - Residue theorem - Application to evaluation of definite integrals - conformal mapping and invariance of Laplacian in two dimensions - Representation of functions by contour integral.
UNIT-2 20 Hrs	Linear Differential equations and Green's function Second order linear differential equations - Liouville's Theorem - Orthogonality of eigenfunctions - Illustration with Legendre, Laguerre, Hermite and Chebyshev differential equations - Location of Zeros of these polynomials - Wronskian, ordinary and singular points - Green's function- Eigenfunction expansion of Green's function - Reciprocity theorem - Liouville type equations in one dimension and their Green's function.
UNIT-3 20 Hrs	Laplace and Fourier transforms Laplace transforms - Solution of linear differential equations with constant Coefficients - Fourier integral - Fourier transforms, Fourier sine and consine transforms - Convolution theorems - Applications.
UNIT-4 20Hrs	Tensor Analysis Definition of scalars - contravariant Vectors and Covariant Vectors - Einstein's summation convention - Definition of tensors - Second rank cartesian tensor as operator - Symmetric and antisymmetric tensors - tensors of rank higher than two - Specific Tensors - Covariant derivatives.

UNIT- 5 15Hrs	Group Theory Definition of groups, subgroups and conjugate classes - Symmetry elements, Transformation, Matrix representation - Point groups - representation of a group - Reducible and irreducible representations - Orthogonality theorem - character of a representation - character Table C_{2v} and C_{3v} - Application to Infrared and Raman active vibrations of XY_3 type molecules - Projection operators applied to an equilateral triangle - Rotation group and angular momenta.
SUGGESTED READINGS	1. Mathematical Methods for Physicists: George Arfken , Academic Press 2. Applied Mathematics for Engineers and Physicists: L. A. Pipe , McGraw Hill 3. Mathematical Methods - Potter and Goldberg , Prentice Hall of India 4. Elements of Group Theory for Physicists: A.W. Joshi, Wiley Eastern Ltd. 5. Vector Analysis (Schaum Series), McGraw Hill

M.Sc. in PHYSICS (FIRST SEMESTER)	
COURSE CODE: MSP 111 **COURSE TYPE :** CCC	
COURSE TITLE: GENERAL EXPERIMENTS	
CREDIT: 06 **THEORY:** 00 **PRACTICAL:** 06	**HOURS:** 135 **THEORY:** 00 **PRACTICAL:** 135

LABORATORY WORK
MSP 111

GENERAL EXPERIMENTS

1. Cornu's method - Young's modulus by elliptical fringes.

2. Cornu's method - Young's modulus by hyperbolic fringes.

3. Determination of Stefan's constant.

4. Band gap energy - Thermister.

5. Hydrogen spectrum - Rydberg's constant.

6. Co-efficient of linear expansion - Air wedge method.

7. Permittivity of a liquid using RFO.

8. Viscosity of liquid - Meyer's disc.

9. Solar spectrum - Hartmann's Interpolation formula

10. F.P. Etalon using spectrometer.

11. Iron / Copper arc spectrum.

12. Brass / Alloy arc spectrum.

M.Sc. in PHYSICS (FIRST SEMESTER)	
COURSE CODE: MSP 102 **COURSE TYPE :** CCC	
COURSE TITLE: CLASSICAL MECHANICS	
CREDIT: 06 **THEORY:** 06 **PRACTICAL:** 00	**HOURS:** 90 **THEORY:** 90 **PRACTICAL:** 00
MARKS: 100 **THEORY:** 70 **CCA :** 30 **PRACTICAL:** 00	
OBJECTIVE: The main objective is to learn about Classical Mechanics .	
UNIT-1 15Hours	Rigid body dynamics Angular momentum, rotational kinetic energy and moment of inertia of a rigid body - Euler's angles - Euler's equations of motion - Torque - free motion of a rigid body - Motion of a symmetrical top under the action of gravity.
UNIT-2 20Hours	Constraints : holonomic and non-holonomic constraints, D'Alembert's Principle and Lagrange's Equation, velocity dependent potentials, simple applications of Lagrangian formulation. Hamilton Principle, Calculus of Variations, Derivation of Lagrange's equation from Hamilton's principle. Extension of Hamilton's Principle for non-conservative and nonholonomic systems, Method of Lagrange's multipliers, Conservation theorems and Symmetry Properties, Noether's theorem. Conservation of energy, linear momentum and angular momentum as a consequence of homogeneity of time and space and isotropy of space.
UNIT-3 20 Hours	Generalized momentum, Legendre transformation and the Hamilton's Equations of Motion, simple applications of Hamiltonian formulation, cyclic coordinates, Routh's procedure, Hamiltonian Formulation of Relativistic Mechanics, Derivation of Hamilton's canonical Equation from Hamilton's variational principle. The principle of least action.
UNIT-4 20Hrs	Canonical transformation, integral invariant of poincare: Lagrange's and Poisson brackets as canonical invariants, equation of motion in Poisson bracket formulation. Infinitesimal contact transformation and generators of symmetry, Liouvilee's theorem, Hamilton-Jacobi equation and its application.

UNIT- 5 15Hrs	Action angle variable adiabatic invariance of action variable: The Kepler problem in action angle variables, theory of small oscillation in Lagrangian formulation, normal coordinates and its applications.
SUGGESTED READINGS	1. H. Goldstein, 2002, Classical Mechanics. 3rd Edition., C. Poole and J.Safko, Pearson Education, Asia, New Delhi. 2. S.N. Biswas, 1998, Classical Mechanics, Books and Allied Ltd., Kolkata. 3. L.D. Landau and E.M. Lifshitz, 1969, Mechanics, Pergomon Press, Oxford. 4. K.R. Symon, 1971, Mechanics, Addison Wesley, London. 5. J.L. Synge and B.A Griffith, 1949, Principles of Classical Mechanics, Mc. Graw-Hill, New York. 6. C.R.Mondal, Classical Mechanics, Prentice - Hall of India, New Delhi. 7. A. Raychoudhary , Classical Mechanics, Oxford University Press

M.Sc. in PHYSICS (FIRST SEMESTER)	
COURSE CODE: MSP 103 **COURSE TYPE :** CCC	
COURSE TITLE: QUANTUM MECHANICS I	
CREDIT: 06 **THEORY: 06**	**HOURS: 90** **THEORY: 90**
MARKS: 100 **THEORY: 70 CCA : 30**	
OBJECTIVE: The main objective is to learn about Quantum Mechanics .	
UNIT-1 20Hrs.	Basic formalism Wave functions for a free particle - Interpretation and conditions on the wave function - Postulates of quantum Mechanics and the Schroedinger equation - Ehrenfest's theorem - Operator formalism - Linear operators - Self adjoint operators - Expectation Value - Stationary States - Hermitian Operators for dynamical variables - Eigen values and eigen function - Orthonormality - Uncertainty Principle.
UNIT-2 15Hrs	Applications Ladder operators and simple harmonic oscillator - Rigid rotator - Step Potential - Particle in a central potential - Particle in a periodic potential - Orbital angular momentum and spherical harmonics - Central forces and reduction of two body problem - Particle in a Spherical well - Hydrogen atom.
UNIT-3 15 Hours	General formalism: Hilbert's space - Dirac notation - Representation theory - Co-ordinate and momentum representations - Time evolution - Schroedinger, Heisenberg and Interaction pictures - Symmetries and conservation laws - Unitary transformations associated with translations and rotations.

UNIT-4 20Hrs	Approximation methods Time-independent perturbation theory for non- degenerate and degenerate levels - Application to ground state of anharmonic oscillator and Stark effect in Hydrogen - Variation method - Application to ground state of Helium atom - WKB approximation - WKB quantization rule - Application to simple Harmonic Oscillator.
UNIT- 5 20 Hrs	Angular momentum and identical particles Commutation rules for angular momentum operators - Eigen value spectrum from angular momentum algebra - Matrix representation - Spin angular momentum - Non-relativistic Hamiltonian including spin - Addition of two angular momenta - Clebsch - Gordan coefficients - Symmetry and anti symmetry of wave functions - Pauli's spin matrices.
SUGGESTED READINGS	1. P.M. Mathews and K. Venkatesan, 1976, A Text book of Quantum Mechanics, Tata McGraw-Hill, New Delhi. 2. L.I. Schiff, 1968, Quantum Mechanics, 3rd Edition, International Student Edition, McGraw-Hill Kogakusha, Tokyo. 3. V. Devanathan, 2005, Quantum Mechanics, Narosa Publishing House, New Delhi. 4. E. Merzbacher, 1970, Quantum Mechanics 2nd Edition, John Wiley and Sons, New York. 5. V.K. Thankappan, 1985, Quantum Mechanics, 2nd Edition, Wiley Eastern Ltd, New Delhi. 6. P.A.M. Dirac, 1973, The Principles of Quantum Mechanics, Oxford University Press, London. 7. L.D. Landau and E.M. Lifshitz, 1976, Quantum Mechanics, Pergomon Press, Oxford. 8.Ashok Das and A.C. Melissions: Quantum Mechanics - A modern approach (Gordon and Breach Science Publishers).

M.Sc. in PHYSICS
(FIRST SEMESTER)

COURSE CODE: MSPS01	COURSE TYPE:OSC
COURSE TITLE:RESEARCH METHODOLOGY & COMPUTER APPLICATION: BASICS	
CREDIT: 06 THEORY: 06	HOURS : 90 THEORY: 90
MARKS : 100 THEORY: 70 CCA : 30	

OBJECTIVE:

- Understands the concept and place of research in concerned subject
- Gets acquainted with various resources for research
- Becomes familiar with various tools of research
- Gets conversant with sampling techniques, methods of research and techniques of analysis of data
- Achieves skills in various research writings
- Gets acquainted with computer Fundamentals and Office Software Package .

UNIT - 1 15 Hrs	**CONCEPT OF RESEARCH :** Meaning and characteristics of research , Steps in research process , Types of research - i) Basic, applied and action research ii) Quantitative and qualitative research , Areas of research in concern discipline **SELECTION OF PROBLEM FOR RESEARCH :** Sources of the selection of the problem , Criteria of the selection of the problem ,Drafting a research proposal , Meaning and types of variables ,Meaning and types of hypotheses.
UNIT - 2 15 Hrs	**TOOLS OF RESEARCH :** Meaning and general information about construction procedure of (i) Questionnaire, (ii) Interview, (iii) Psychological test, (iv) observation (v) Rating scale (vi) Attitute scale and (vii) check list , Advantages and disadvantages of above tools **SAMPLING :** Meaning of population and sample , Importance and characteristics of sample , Sampling techniques - i) Probability sampling : random sampling, stratified random sampling, systematic sampling, cluster sampling ii) Non-probability sampling: incidental sampling, purposive sampling, quata sampling
UNIT - 3 15 H rs	**METHODS OF RESEARCH** Meaning and conducting procedure of following methods of research : Historical method , Survey method , Case study , Causal comparative method , Developmental methods , Experimental methods
UNIT - 4 15 Hrs	**TREATMENT OF DATA :** Level of measurements of data , Steps in treatment of data: editing, coding, classification, tabulation, analysis and interpretation of results **WRITING RESEARCH REPORT :** Sections of report : Preliminary section , Content section : various chapters , Supplementary section : appendices, references, abstract , Format and style

UNIT - 5 15 Hrs	**Computer Fundamentals** **Computer System :** Features, Basic Applications of Computer, Generations of computers. **Parts of Computer System :** Block Diagram of Computer System ; Central Processing Unit (CPU) ; Concepts and types of Hardware and Software, Input Devices - Mouse, Keyboard, Scanner, Bar Code Reader, track ball ; Output Devices - Monitor, Printer, Plotter, Speaker ; Computer Memory - primary and secondary memory, magnetic and optical storage devices. **Operating Systems - MS Windows :** Basics of Windows OS ; Components of Windows - icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders ; **Control panel :** display properties, adding and removing software and hardware, setting date and time, screensaver and appearance ; **Windows Accessories :** Calculator, Notepad, WordPad, Paint Brush, Command Prompt, Windows Explorer.
UNIT - 6 15 Hrs	**Office Software Package** **Word Processing - MS Word :**Creating, Saving, Opening, Editing, Formatting, Page Setup and printing Documents ; Using tables, pictures, and charts in Documents ; Using Mail Merge sending a document to a group of people and creating form, letters and label. **Spreadsheet - MS Excel :**Opening a Blank or New Workbook, entering data/Function/ Formula into worksheet cell, Saving, Editing, Formatting, Page Setup and printing Workbooks. **Presentation Software - MS Power Point :** Creating and enhancing a presentation, modifying a presentation, working with visual elements, adding Animations & Transitions and delivering a presentation.
SUGGESTED READINGS	*Agrawal, Y. P. (1988). **Better sampling : Concepts, Techniques and Evaluation.** New Delhi : sterling Publishers Private Ltd. Best, J. W. (1993).* ***Research in Education** (6th ed.) New Delhi : Prentice-Hall of India Pvt. Ltd.* *Broota, K. D. (1992) **Experimental design in Behavioral Research** (2nd ed.)* *New Delhi : Wiley Eastern Limited.* *Dasgupta, A. K. (1968). **Methodology of Economic Research**. Bombay: Asia Publishing House.* *Edwards, A. L. (1957). **Techniques of Attitude Scale construction.** New York : Appleton-Century* *Gall, M. D., Gall, J. P. and Borg, W. R. (2007). **Educational Research : An introduction*** *(8th ed.) Coston : Allyn and Bacon.* *Garrett, H. E. & Woodworth, R. S. (1969). **Statistics in Psychology and Education**. Bombay : Vakils, Fecffer & Simons Pvt. Ltd.* *Goode, W. J. & Hatt, Paul K. (1952). **Methods in Social Research.** New York : McGraw-Hill.* *Gopal, M. H. (1964). **An Introduction to research Procedure in Social Sciences.** Bombay : Asia Publishing House.* *Hillway, T. (1964) **Introduction to Research (2nd ed.)** Noston : Houghton Miffin.* *Hyman, H. H., et al. (1975). **Interviewing in Social Research.*** *Chicago : University of Chicago Press.* *Kerlinger, F. N. (1983) **Foundation of Behavioural Research. (2nd Indian Reprint)*** *New York : Holt, Rinehart and Winston.* *Kothari, C. R. (2007) **Research Methodology: Methods & Techniques** (3rd ed.)* *New Delhi : Wishwa Prakashan.Fundamentals Of Computers, Dr. P. Mohan, Himalaya Publishing House.* *Microsoft First Look Office 2010. K. Murray, Microsoft Press.* *Fundamental Of Research Methodology And Statistics, Y.K. Singh, New Age International (P) Limited, Publishers.Practical Research Methods, Dr Catherine Dawson,* *The Essence Of Research Methodology, Jan Jonker & Bartjan Pennink, Springer.*

M.Sc. in PHYSICS (FIRST SEMESTER)	
COURSE CODE: MSPA01COURSE TYPE: ECC/CB	
COURSE TITLE:CONSTITUTIONALISM & INDIAN POLITICAL SYSTEM	
CREDIT: 06 **THEORY: 06**	**HOURS : 90** **THEORY: 90**
MARKS : 100 **THEORY: 70 CCA : 30**	

OBJECTIVE:

- Understands the concept of Constitutionalism
- Gets acquainted with various Indian Political System
- Becomes familiar with various Union Executive
- Gets conversant with Legislatures, Legislative Bills
- Achieves skills in various writings

UNIT - 1 12 Hrs	Unit- I: Meaning: Constitution, Constitutional government & constitutionalism; Difference between Constitution & Constitutionalism; Constitutionalism: Basis, Elements, Features & future. Forms of Government: Democracy & Dictatorship, Unitary & Federal, Parliamentary & Presidential form. Ideals of the Indian Constitution incorporated in the Preamble. Special Features of the Indian Constitution.
UNIT - 2 24 Hrs	Unit-II: Concept of State and Citizenship, Judicial Review and Fundamental Rights, Directive Principles of the State Policy, Fundamental Duties, Procedure to Amend the Indian Constitution, Judiciary: Supreme Court and High Court, Judicial Activism and Public Interest Litigation and Provisions relating to Emergency.
UNIT - 3 10 H rs	Unit-III: Union Executive- President, Prime Minister, Council of Ministers. State Executive- Governor, Chief Minister and Council of Ministers. Local Bodies & Panchayati Raj
UNIT - 4 24 Hrs	Unit-IV: Parliament of India, State Legislatures, Legislative Bills: Ordinary, Money and Financial, Union State Relations, Principles of the 'Separation of Power and the 'Principles of Check & Balance'. Political Parties and Pressure Groups. Challenges before Indian Democracy: Terrorism, Regionalism, Communalism, *Linguistics* and National Integration.
UNIT - 5 20 Hrs	Unit-V: Controller & Accountant General of India, Solicitor General, Advocate General, Election Commission, Union and State(s) Public Service Commission, Finance Commission.

SUGGESTED READINGS	
	HOBBES, Thomas, The Leviathan, Chapters XIII & XVII [entry] LOCKE, John, The Second Treatise of Civil Government, Chapter IX [entry] ROUSSEAU, Jean-Jacques, The Social Contract or Principles of Political Right MONTESQUIEU, The spirit of the laws, RAZ, Joseph, "The rule of law and its virtue", in The authority of law, Oxford University Press, 1979 Dicey on British constitution P. Ishwara Bhat Inter-relationship between Fundamental Rights M P Jain Indian Constitutional Law H M Seervai Constitutional Law of India V N Shukla Constitution of India D DBasu Shorter Constitution of India B Sivarao Constitutional Assembly Debates J. V R Krishna Iyer Fundamental Rights and Directive Principles Paras Diwan Human Rights and the Law P K Tripathi Some Insight into Fundamental Rights S P Sathe Fundamental Rights and Amendment to the Constitution P B Gajendragadkar Law, Liberty and Social Justice David Karrys Politics of Law

M.Sc. in PHYSICS (FIRST SEMESTER)	
COURSE CODE: MSPA02 **COURSE TYPE : ECC/CB**	
COURSE TITLE: **Electronic Devices and Applications**	
CREDIT: 06 **THEORY: 06**	**HOURS: 90** **THEORY: 90**
MARKS: 100 **THEORY: 70 CCA : 30**	
OBJECTIVE: The main objective is to learn about Electronic Devices and Applications	
UNIT- 1 20Hrs.	Fabrication of IC and logic families Fabrication of IC - Monolithic integrated circuit fabrication - IC pressure transducers - Monolithic RMS - Voltage measuring device - Monolithic voltage regulators - Integrated circuit multipliers - Intergrated circuit logic - Schottky TTL - ECL - I2L - P and NMOS Logic - CMOS Logic - Tristate logic circuits.
UNIT-2 20Hrs	Opto electronic devices Light sources and Displays - Light emitting diodes - Surface emitting LED - Edge Emitting LED - Seven segment display - LDR - Diode lasers - Photo detectors - Basic parameters - Photo diodes - p-i-n Photo diode - Solar cells - Photo transistors - IR and UV detectors.
UNIT-3 20Hrs	Timer and applications 555 Timer - Description - Monostable operation - Frequency divider - Astable operation - Schimitt trigger - Phase Locked Loops - Basic principles - Analog phase detector - Voltage Controlled Oscillator - Voltage to Frequency conversion - PLL IC 565 - Description - Lock-in range - Capture range - Application - Frequency multiplication.

UNIT-4 15Hrs	Op-amp applications Instrumentation amplifier - V to I and I to V converter - Op-amp circuits using diodes - Sample and Hold circuits - Log and Antilog amplifiers - Multiplier and Divider - Electronic analog Computation - Schimitt Trigger - Astable, Monostable Multivibrator - Triangular wave generators - Sine wave generators - Rc Active filters.
UNIT- 5 15Hrs	Pulse and digital Communication Pulse communications - Introduction - Types - Pulse-Amplitude Modulation (PAM) - Pulse Time Modulation - Pulse Width Modulation (PWM) - Pulse Position Modulation (PPM) - Pulse Code Modulation (PCM) - Principles of PCM - Quantizing noise - Generation and Demodulation of PCM - Effects of Noise - Advantages and applications of PCM - Pulse systems - Telegraphy - Frequency-Shift keying - Telemetry - Digital communication - Modem classification - Modes of modem operation - Modem interconnection - Modem interfacing.

SUGGESTED READINGS

1. S.M. Sze, 1985, Semiconductor Devices - Physics and Technology, Wiley, New York.

2. Millman and Halkias, Integrated Electronics, McGraw-Hill, New Delhi.

3. R.A. Gaekwad, 1994, Op-Amps and intergrated circuits EEE.

4. Taub and Shilling, 1983, Digital Integrated Electronics, McGraw-Hill, New Delhi.

5. J. Millman, 1979, Digital and Analog Circuits and Systems, McGraw-Hill, London.

6. George Kenndy, 1987, Electronic communication systems 3rd Edition, McGraw-Hill, London.

7. R.F. Coughlin and F.F, Driscol, 1996, Op-Amp and linear integrated circuits, Prentice Hall of India, New Delhi.

8. M.S.Tyagi, Introduction to Semiconductor Devices, Wiley, New York.

9. P. Bhattacharya, 2002, Semiconductor Optoelectronic Devices, 2nd Edition, Prentice-Hall of India, New Delhi.

10. Deboo/ Burrous, 1985, Integrated circuits and semiconductor Devices - Theory and application, McGraw-Hill, New Delhi.

11. D. Roy Choudhury, 1991, Linear integrated circuits, Wiley Eastern, New Delhi.

12. Ramakant Gaekwad, 1981, Operational amplifiers, Wiley Eastern, New Delhi.

M.Sc. in PHYSICS (FIRST SEMESTER)	
COURSE CODE: MSPA03 **COURSE TYPE : ECC/CB**	
COURSE TITLE: CONDENSED MATTER PHYSICS - I	
CREDIT: 06 **THEORY: 06**	**HOURS : 90** **THEORY: 90**
MARKS : 100 **THEORY: 70 CCA : 30**	
OBJECTIVE: The main objective is to learn aboutCondensed Matter Physics .	
UNIT- 1 20Hrs.	Phase transformation and alloys: Equilibrium transformation of first and second order, equilibrium diagrams, phase rule, interpretation of phase diagrams, substitutional solid solutions, Vegard's law, intermediate phases, Hume-Rothery rules, interstitial phases (carbides, nitrides, hydrides, borides). Martensitic transitions.
UNIT-2 20Hrs	High temperature superconductors and GMR/CMR materials: High temperature superconductors, normal state properties (structural phase transition) of cuprates, phase separation and charge distribution into CuO2 planes, striped phase, phase diagram, pseudogap, dependence of Tc on crystal structure, effect of impurities .GMR/CMR materials, Ruddlesden-Popper series of perovskites. Onset of ferromagnetism and metallic conduction. Double exchange.
UNIT-3 20 H rs	Novel organic materials : Special carbon solids, fullerenes and tubules, formation and characterization of fullerenes and tubules. Single wall and multi-wall carbon tubules. Electronic properties of tubules. Carbon nanotubule based electronic devices.

UNIT-4 15 Hrs	Polymers – amorphous polymers, glass transition temperature, effect of molecular architecture on glass transition temperature, free volume theory for glass transition, conducting polymers, optical band gap of polymers, electrical conduction in conducting polymers, mechanical and thermal properties of polymers, polymer blends and composites.
UNIT- 5 15 Hrs	Structural characterization and electron structure determination:Basic theory of X-ray diffraction, indexing of Debye-Scherrer patterns from powder samples, examples from some cubic and non-cubic symmetries. Neutron diffraction – basic interactions, cross section, scattering length and structure factor. Basic principles of X-ray absorption spectroscopy, photo emission and positron annihilation techniques. Qualitative discussion of experimental arrangement and of typical results for both simple as well as transition metals.
SUGGESTED READINGS	1. Andrei Mourachkine: Room temperature superconductivity, Cambridge International Science Publishing. 2. C.N.R. Rao: Colossal magnetoresistance, charge ordering and related properties of managanese oxide, Woprld Scientific, 1998 3. Polymer Physics by Ulf W. Gedde, Chapmann & Hall, 2001. 4. Introduction to Polymer Physics by David. I. Bower. 5. Polymer Science by J.R. Fried.

M.Sc. in PHYSICS (FIRST SEMESTER)	
COURSE CODE: MSPA04 **COURSE TYPE : ECC/CB**	
COURSE TITLE: HIGH ENERGY PHYSICS I	
CREDIT: 06 **THEORY: 06**	**HOURS : 90** **THEORY: 90**
MARKS : 100 **THEORY: 70 CCA : 30**	
OBJECTIVE: The main objective is to learn aboutHigh Energy Physics .	
UNIT- 1 20Hrs.	Elementary particles and the fundamental forces. Quarks and leptons. The mediators of the electromagnetic, weak and strong interactions. Interaction of particles with matter; particle acceleration, and detection techniques. Symmetries and conservation laws.
UNIT-2 20Hrs	Bound states. Discoveries and observations in experimental particle physics and relation to theoretical developments.
UNIT-3 20 H rs	Symmetries, group theory, The gourp SU92), Finite Symmetry Group: P and C, SU(2) of Isospin, The group SU(3)
UNIT-4 15 Hrs	Quark and Antiquark states: Mesons, Three quark states: Baryon, color factors. Asymptotic freedom. Charged and neutral weak interactions. Electroweak unification.
UNIT- 5 15 Hrs	Decay rates. Cross sections. Feynman diagrams Introduction to Feynman integrals. The Dirac equation. Feynman rules for quantum electrodynamics (no derivation).

SUGGESTED READINGS	
	1. Francis Halzen and Allan D. Martin, Quarks and Leptons: An Introductory Course in Modern Particle Physics, John Wiley and Sons 2. B.R. Martin and G. Shaw, Particle Physics, 2nd edition, J. Wiley and Sons (1997). 3. The Review of Particle Physics, Particle Data Group 4. David Griffiths, Introduction to Elementary Particles 5. Byron Roe Particle Physics at the New Millennium 6. Donald Perkin, Introduction to high energy physics.