MOHAN LAL SUKHADIA UNIVERSITY, UDAIPUR (Raj.)

SYALLBUS

FACULTY OF EDUCATION

SCHEME OF EXAMINATION & COURSE OF STUDIES

B.Sc.B.Ed. FOUR- YEARS INTEGRATED PROGRAMME

Mohanlal Sukhadia University, Udaipur (Raj.) – 313 001

MOHAN LAL SUKHADIA UNIVERSITY, UDAIPUR (Raj.)

Scheme of Examination and Course of Studies

BACHELOR OF SCIENCE (B.Sc) & BACHELOR OF EDUCATION (B.Ed.)

B.Sc.B.Ed FOUR YEARS INTEGRATED COURSE

(B.Sc.B.Ed. Programme Is a Full Time, Four Academic Session Programme; Each Session
Will Be of 200 Days Duration)

1. INTRODUCTION

Destiny of a nation is shaped in its classrooms and teacher is the architect who shapes the destiny. Enlightened, emancipated and empowered teachers lead communities and nations towards better and higher quality of life. Teachers are expected to create soul cohesion, national integration and learning society. They disseminate knowledge and generate new knowledge. It is therefore, essential for nation to
have a sound and effective programme of teacher preparation. The teacher education programme needs to be upgraded and updated periodically.

A perusal of the reports of various commissions and committees indicate the preference for longer duration of B.Sc.B.Ed.course. It was also endorsed by the Hon'ble Supreme Court of India in its judgement on 15 June 1993. "The Teachers Training Institutes are meant to teach children of impressionable age and we cannot let loose on the innocent and unwary children the teachers who have not received proper and adequate training. True, they will be required to pass the examination but that may not be enough. Training for a certain minimum period in a properly organised training institute is essential before a teacher may be duly launched." The NCTE (2009) recommended a four year B.Sc.B.Ed.course. Earlier too in 1998 NCTE had recommended four year B.Sc.B.Ed. course in its earlier curriculum framework. The NCERT had prepared four year B.Sc.B.Ed. curriculum and launched it in the Regional Institutes of Education in 1999.

Now, finally the NCTE has recommended that the B.Sc.B.Ed. Course should be of four years duration and has prepared a Curriculum Framework for Four year B.Sc.B.Ed. Programme. Mohanlal Sukhadiya University also decided to introduce four year B.Sc.B.Ed. course and has prepared a detailed course of study and Scheme of Examination for four years B.Sc.B.Ed. course on the basis of guideline given in the curriculum framework. The four year B.Sc.B.Ed. course will come in to force from the session commencing in 2016. The four year B.Sc.B.Ed. course aims at a complete development of the student-teacher; particularly in knowledge and skills, in

individual care of the learner and also in methods and evaluation designed to facilitate learning. This course is divided into four parts. It aims at developing understanding of and competence to render disciplinary knowledge into forms relevant to stage specific understanding of teaching-learning situation apprehended through intensive study of conceptual explanations, observation and analysis of live classroom situations as well as hand-on experiences and longer duration of field experience. Interactive processes, i.e. group reflection, critical thinking and meaning-making have been encouraged. The maturity of student-teachers has been kept in mind while visualizing modes of learning engagements; instead of continuous teacher monitoring, greater autonomy to learners has been given in accordance with andragogic principles of learning. The syllabus retains the essence of student-teachers being active participants in the learning process and prepares the student-teachers for facing the emerging challenges resulting out of globalization and its consequences. Therefore it becomes essential for any nation to give necessary professional inputs to its teachers. Mohanlal Sukhadia University pursues the following curriculum for its pre-service teacher training programme. The curriculum also aims at developing language proficiency of the pupil teacher by providing him opportunities through different activities and course content.

The B.Sc.B.Ed. Courses are integrated progressive in accruing the doubles bachelor's degree which are the B.Sc. & B.Ed degree. The degree enable's the students to complete the B.Ed Education along with the B.Sc degree course. The courses are conducted by M.L.S.U.

3. OBJECTIVES OF THE COURSE

The objectives of theory course prescribed for the B.Sc. B.Ed. course are as follows:

1. To develop competence to teach subjects of their specialization on the basis of an adequate theory of learning and a sound knowledge of the subjects.
2. To develop interest, attitude and knowledge which will enable them (i) to foster the all-round growth and development of children under their care and (ii) to provide guidance to individual pupils?
3. To develop an understanding of the aims and objectives of education in the Indian background and to promote an awareness of the role of the school and the teacher in realizing these aims and ideals.
4. To develop an understanding of the close relationship between societies and the school, between life and school work.
5. To become self-regulated learners; develop professional commitment and work as responsible professionals.
6. To make them comfortable with content and pedagogical effective use and utilization of ICT.
7. To enable them to critically analyse the various evaluation tools to serve CCE.

8. To reflect on teacher practices and interface with societal resources
9. To build up professional consciousness.

The objectives of practical work prescribed for the B.Sc. B.Ed. course are as follows:

To develop the ability and self-confidence of pupil teachers to-

1. Be conscious of a sense of values and need for their inculcation in children through all available means including ones own personal life.
2. Posses a high sense of professional responsibility.
3. Develop resourcefulness so as to make the best use of the situation available.
4. Appreciate and respect each child's individuality and treat him as an independent and integrated personality.
5. Arouse their curiosity and interest and secure their active participation in the education process.
6. Develop capacity for thinking and working independently and guide them to that end.
7. Organize and manage the class for teaching learning.
8. Appreciate the dynamic nature of the classroom situation and teaching techniques.
9. Define objectives of particular lessons and plan for achievement.
10. Organize the prescribed subject matter in relation to the needs, interest and abilities of the pupils.
11. Use appropriate teaching methods and techniques.
12. Prepare and use appropriate teaching aids, use of the black board and other apparatus and materials properly.
13. Convey ideas in clear and concise language and in a logical manner for effective learning.
14. Undertake action research.
15. Give proper opportunity to the gifted pupils and take proper care of the pupils with special need.
16. Correlate knowledge of the subjects being taught with other subjects and with real life situations as and when possible.
17. Prepare and use assignment.
18. Evaluate pupil's progress.
19. Plan and organize co-curricular activities and participate in them.

20. Co-operate with the school teachers and administrators and learn to maintain school records and registers.

Learning Outcomes

After the completion of the course the student teacher is expected to attain the following learning out comes:

1. Competence to teach effectively two school subjects at the secondary/senior secondary level.
2. Ability to translate broad objectives of secondary/senior secondary education in terms of specific programmes and activities in relation to the curriculum.
3. Ability to understand children's needs, motives, growth pattern and the process of learning to stimulate learning and creative thinking to foster growth and development.
4. Ability to use (a) individualized instruction and (b) dynamic methods in large classes.
5. Ability to examine pupil's progress and effectiveness of their own teaching through the use of proper evaluation techniques.
6. Use of Equipment for diagnosing pupil's difficulties and deficiencies in achievement and dealing with them through remedial work.
7. Readiness to spot talented and gifted children and capacity to meet their needs.
8. Ability to cater to the need of children with special needs.
9. Ability to organize various school programmes, activities for pupils.
10. Ability to provide guidance in educational, personal and vocational matters.
11. Ability to assess the all round development of pupils and to maintain a cumulative record.
12. Development of certain practical skills such as:

- Black board work
- Preparing improvised apparatus
- Preparing teaching aids

13. Developing professional competence.
14. Readiness to participate in activities of professional organizations.

3. MODES OF LEARNING ENGAGEMENT

Overall Intention of Modes of Learning Engagement

- The Curriculum is so designed that the student-teachers internalize the nature of education and pedagogic process through enriched experiences.
- The kinds of learning engagement suggested will contribute to reduction of the gap between theory and practice by dovetailing both appropriately.
- The Curriculum emphasises the use of varied modes of learning engagement in accordance with the requirements.
- Interactive processes wherein group reflection, critical thinking and meaning making will be encouraged.
- In this respect, critical theory, critical pedagogy and critical thinking become very crucial theoretical inputs and are embedded implicitly in various courses.
- While visualizing modes of learning engagement, the nature of student teachers who are adults has been kept in mind. Instead of continuous teacher monitoring greater autonomy to learners has been recommended which is more relevant and in accordance with the andragogic principles of learning.
- Multiple learning engagements visualized being more active / interactive, the course work is

Clearly not meant to be burdensome and 'memory based', but challenging and engaging.

Some Specific Modes of Learning School Observation

- Observation of school infrastructure.
- Short Lesson plan.
- Innovation in teaching learning.
- Importance of interaction between Parents & Teachers.
- Tutorial classes.
- Prepare a Sociomatry test.
- To develop and evaluate moral values.
- To prepare, administrate & analysis of a questionnaire.

These are suggestive modes of learning engagement. Teacher educators will have to create, design and evolve different modes of learning engagement based on the course and suited to the needs of student teachers.

Enhancement of Learning through School-based Experiences

Most courses require school experience for various purposes. I year significant aspect is School observation Single school visit for carrying out tasks related to course .School-based experience to learn not only classroom pedagogy, but also learning to function as a teacher in the school environment.

Perspectives in Education

Perspectives in Education include courses in the study of childhood, child development and adolescence, contemporary India and education

Course 1 Childhood and Growing Up

Course 2 Contemporary India and Education (Including Gender, School and Society)

The course on 'Childhood and Growing up' shall enable student-teachers to en gage with studies on Indian society and education, acquire conceptual tools of sociological analysis and hands-on experience of engaging with diverse communities, children and schools. The course on 'Contemporary India and Education' shall develop a conceptual understanding about issues of Diversity, inequality and marginalization in Indian society and the implications for education, with analyses of significant policy debates in Indian education. These courses shall aim to develop in students an understanding of the curriculum, linking school knowledge with community life. A variety of investigative projects, that link with curricular area III given below, shall be included to reconstruct concepts from subject knowledge though appropriate pedagogic processes that communicates meaningfully with children. Optional courses will be offered in areas such as Vocational/Work Education, Health and Physical Education, Peace Education, Guidance and Counseling,

Select three subjects by choosing any one subject in one group.

Group A – PHYSICS / CHEMISTRY / MATHS

B – BOTANY / ZOOLOGY / CHEMISTRY

4. EVALUATION

EVALUATION OF THEORY PAPERS

Some theory papers will carry a weightage of 100 marks, out of which 80 marks will be for external University Examination and 20 marks will be for internal sessional work. Out of 20 marks - 10 marks will be for sessional and 10 marks will be for mid-term test. The final external examination paper for **80 marks will be of three hour's duration**

1. Each question paper (80 MARKS) will have three sections- **Section A** will contain 10 very short answer type questions and the candidate will be required to attempt the entire ten questions. Each question will carry two marks. **Section-B** will contain 10 short answer type questions out of which a candidate is required to attempt any 5 questions (one question per unit to be attempted out of two questions per unit). Each question will carry 6 marks. **Section-C** will have 5 questions and a candidate will be required to attempt any three questions. There will be 10 marks for each question.

2. Very short answer type questions would aim at testing of critical thinking, knowledge of concepts,

facts, definitions, laws, principles, generalization etc. and also understanding of principles and

concepts.

3. Short answer type questions would aim at testing knowledge, definitions, laws, generalization etc.

And also understanding of concepts.

4. Essay type questions are to aim at testing the abilities of critical thinking and application of Principles taught in theory.

Question Type	No. of Questions per Unit	Total No. of Questions	No. of Questions to be attempted	Total Marks
Very short question type	**2 Per Unit**	**10**	**10**	**10 x 2 = 20**
Short Question Type	**2 Per Unit**	**10**	**5 (One question per unit to be attempted)**	**5 x 6 = 30**
Long Question Type	**1 Per Unit**	**5**	**3**	**3 x 10 = 30**

5.THE CURRICULAR DETAILS FOR FOUR YEARS

ANNUAL DISTRIBUTION OF THE COURSES

B.Sc.B.Ed FOUR YEARS INTEGRATED COURSE I - Year					
Course No.	**Paper Code**	**Name of Subject**	**Paper**	**Max. Marks**	**Min. Marks**
Course 1	**9371**	**Childhood and Growing up**	**Theory**	**100 (80+20)**	**36**
Course 2	**9372**	**Contemporary India and Education (Including Gender, School & Society)**	**Theory**	**100 (80+20)**	**36**
Course 3	**9373**	**Understanding the Self (Internal Assessment)**		**50**	**20**
Course 4	**9374**	**School Observation**	**Presentation & Documentation**	**50**	**20**
Course 5	**9601**	**Core Subjects***			
		a) Gen English.	**Theory**	**100**	**36**
	9602	**b) Environmental Studies**	**Theory**	**75**	**27**
			Fieldwork	**25**	**9**
Course 6	**9341**	**Physics I**	**I**	**50**	**18**
	9342	**Physics II**	**II**	**50**	**18**
	9343	**Physics III**	**III**	**50**	**18**
	9344	**Physics Practical**	**Practical**	**50**	**18**
Course 7	**9345**	**Chemistry I**	**I**	**50**	**18**
	9346	**Chemistry II**	**II**	**50**	**18**
	9347	**Chemistry III**	**III**	**50**	**18**
	9348	**Chemistry Practical**	**Practical**	**50**	**18**
Course 8	**9349**	**Zoology I**	**I**	**50**	**18**
	9350	**Zoology II**	**II**	**50**	**18**
	9351	**Zoology III**	**III**	**50**	**18**
	9352	**Zoology Practical**	**Practical**	**50**	**18**
Course 9	**9353**	**Botany I**	**I**	**50**	**18**
	9354	**Botany II**	**II**	**50**	**18**
	9355	**Botany III**	**III**	**50**	**18**
	9356	**Botany Practical**	**Practical**	**50**	**18**
Course 10	**9357**	**Mathematics I**	**I**	**50**	**18**
	9358	**Mathematics II**	**II**	**75**	**27**
	9359	**Mathematics III**	**III**	**75**	**27**

B.Sc.B.Ed FOUR YEARS INTEGRATED COURSE II Year					
Course No.	**Paper Code**	**Nomenclature**	**Paper**	**Max. Marks**	**Min. Marks**
Course 11	**9471**	**Learning & Teaching**	**Theory**	**100 (80+20)**	**36**
Course 12	**9491-9495**	**Pedagogy of School Subject I**	**Theory**	**100 (80 +20)**	**36**
Course 13	**9491-9495**	**Pedagogy of School Subject II**	**Theory**	**100 (80+20)**	**36**
Course 12 & 13	**9491**	**1. Pedagogy of General Science**			
	9492	**2 Pedagogy of Physics**			
	9493	**3. Pedagogy of Chemistry**			
	9494	**4. Pedagogy of Biology**			
	9495	**5. Pedagogy of Mathematics**			
Course 14	**9484**	**Pre-Practice Teaching (Internal Assessment)**	**Practical**	**50 (20+10+20)**	**20**
		a) Practicing teaching Skill		**20**	
		b) T.L.M. Workshop in each Subject		**10**	
		c) Simulated teaching		**20**	
Course 15	**9485**	**Open Air Session / SUPW Camp (Internal Assessment)**		**50**	**20**
Course 16	**9603**	**Core Subject***			
		Elementry Computer Application	**Theory**	**60**	**22**
	9604	**Practical**	**Practical**	**40**	**14**
Course 17	**9441**	**Physics I**	**I**	**50**	**18**
	9442	**Physics II**	**II**	**50**	**18**
	9443	**Physics III**	**III**	**50**	**18**
	9444	**Physics Practical**	**Practical**	**50**	**18**
Course 18	**9445**	**Chemistry I**	**I**	**50**	**18**
	9446	**Chemistry II**	**II**	**50**	**18**
	9447	**Chemistry III**	**III**	**50**	**18**
	9448	**Chemistry Practical**	**Practical**	**50**	**18**
Course 19	**9449**	**Zoology I**	**I**	**50**	**18**
	9450	**Zoology II**	**II**	**50**	**18**
	9451	**Zoology III**	**III**	**50**	**18**
	9452	**Zoology Practical**	**Practical**	**50**	**18**
Course 20	**9453**	**Botany I**	**I**	**50**	**18**
	9454	**Botany II**	**II**	**50**	**18**
	9455	**Botany III**	**III**	**50**	**18**
	9456	**Botany Practical**	**Practical**	**50**	**18**
Course 21	**9457**	**Mathematics I**	**I**	**50**	**18**
	9458	**Mathematics II**	**II**	**75**	**27**
	9459	**Mathematics III**	**III**	**75**	**27**

B.Sc.B.Ed FOUR YEARS INTEGRATED COURSE III Year					
Cours No.	**Paper Code**	**Nomenclature**	**Paper**	**Max. Marks**	**Min. Marks**
Course 22	**9571**	**Assessment for Learning**	**Theory**	**100 (80+20)**	**36**
Course 23	**9572**	**Language acroos the curriculam (Including Reading & Reflecting on texts)**	**Theory**	**100 (80+20)**	**36**
Course 24	**9573**	**School Internship (Phase I,4 weeks) Internal assessment Engagement with the field: Tasks and Assignment for courses12 &13.**		**150**	**60**
Course 25	**9574**	**External Assessment one lesson of Pedagogy of a School subject.**		**100**	**40**
Course 26	**9605**	**Core Subject***			
		General Hindi		**50**	**18**
Course 27	**9541**	**Physics I**	**I**	**50**	**18**
	9542	**Physics II**	**II**	**50**	**18**
	9543	**Physics III**	**III**	**50**	**18**
	9544	**Physics Practical**	**Practical**	**50**	**18**
Course 28	**9545**	**Chemistry I**	**I**	**50**	**18**
	9546	**Chemistry II**	**II**	**50**	**18**
	9547	**Chemistry III**	**III**	**50**	**18**
	9548	**Chemistry Practical**	**Practical**	**50**	**18**
Course 29	**9549**	**Zoology I**	**I**	**50**	**18**
	9550	**Zoology II**	**II**	**50**	**18**
	9551	**Zoology III**	**III**	**50**	**18**
	9552	**Zoology Practical**	**Practical**	**50**	**18**
Course 30	**9553**	**Botany I**	**I**	**50**	**18**
	9554	**Botany II**	**II**	**50**	**18**
	9555	**Botany III**	**III**	**50**	**18**
	9556	**Botany Practical**	**Practical**	**50**	**18**
Course 31	**9557**	**Mathematics I**	**I**	**50**	**18**
	9558	**Mathematics II**	**II**	**75**	**27**
	9559	**Mathematics III**	**III**	**75**	**27**

B.Sc.B.Ed FOUR YEARS INTEGRATED COURSE IV Year					
Course No.	**Paper Code**	**Name of Subject**	**Paper**	**Max. Marks**	**Min. Marks**
Course 32	**9671**	**Educational Management & creating an Inclusive school**	**Theory**	**100 (80+20)**	**36**
Course 33	**9672**	**Knowledge & Curriculam.**	**Theory**	**100 (80+20)**	**36**
Course 34	**9673**	**Drama & Art. (Internal Assessment)**		**50**	**20**
Course 35	**9674**	**Optional Courses (any 1). 1. Health & Physical Education. 2. Guidance & Counselling. 3. Peace Education.**		**50 (40+10)**	**18**
Course 36	**9675**	**School Internship (Phase II, 16 Weeks) Engagement with the field: Tasks and Assignment for courses 12 &13.**		**250**	**100**
Course 37	**9676**	**External Assessment Viva-Voce for School Internship subject**		**150**	**60**

SYLLABUS

FIRST YEAR

Course No.	Name of Subject
Course 1	Childhood and Growing up
Course 2	Contemporary India and Education (Including Gender, School & Society)
Course 3	Understanding the Self (Internal Assessment)
Course 4	School Observation
Course 5	Core Subjects*
	a) Gen English.
	b) Environmental Studies
Course 6	Physics I
	Physics II
	Physics III
	Physics Practical
Course 7	Chemistry I
	Chemistry II
	Chemistry III
	Chemistry Practical
Course 8	Zoology I
	Zoology II
	Zoology III
	Zoology Practical
Course 9	Botany I
	Botany II
	Botany III
	Botany Practical
Course 10	Mathematics I
	Mathematics II
	Mathematics III

PAPER CODE-9371

Course 1 - CHILDHOOD & GROWING UP

Objectives─After completion of the course the student teachers will be able to:-

1. Understand the Developmental characteristics of Childhood and adolescence.
2. Learn the Theories of development.
3. Understand Educational provisions of children at different stages of development.
4. Understand the Concepts and Components of Personality.
5. Know the Techniques of Personality Assessment.
6. Understand the Psycho-Analytic Theory of personality.
7. Understand the Concept and Importance of Mental Health and role of Teacher in Promoting Mental Health.
8. Acquire the Concept of Individual Variation and their Classroom Implications.
9. Understand nature and Characteristics of Intelligence.
10. Understand the Theories of Intelligence.
11. Acquire the skill of Measurement of Intelligence.

COURSE CONTENT

UNIT- I Basic Concepts of Child Development

1. Meaning, Scope and Importance of studying Child Development.
2. Methods of study of Children- Case Study, Observation and Field Studies.
3. Basic Concepts in Child Development-Growth V/S Development, Maturation V/S Learning, Heredity vs. Environment (Family, Neighborhood, School and Community)
4. Principles of Growth and Development
5. Stages of Development.

UNIT- II Childhood

1. Developmental characteristics of Childhood with reference to Physical, Cognitive, Motor, Social, Emotional and Moral aspects.
2. Theories of Development- Piaget (cognitive), Erikson (Psychosocial)
3. Educational Implications of Development during Childhood.

UNIT- III Adolescence

1. Characteristics of adolescence development- Physical, Cognitive, Social and Emotional.

2. Difficulties during transition period- Difficulties in Social Transition, Conflicts, Social Attitude and Behavior, Influence of Peers, Conformity and Self assertiveness and Personality Integration.

3. Impact of Urbanization, Economic, Social and Political changes on the construction and experience of adolescence.

4. Issues in adolescence -

- Identity crisis;
- Idealism and Hero worship
- Gender Issues
- Child Labor
- Changing Family Structures
- Peer Pressures
- Pressure of Competition
- Juvenile Delinquency

5. Critical analysis of significant events e.g. Sexual abuse, Harassment, Gender and Poverty.

6. Guidance and Counselling of adolescents.

UNIT- IV Personality and Mental Health

1. Personality Concept, types and Components of Personality.

2. Psychoanalytic theory of Personality by Freud.

3. Factors affecting Personality development.

4. Assessment of Personality- Projective and Non-Projective Techniques.

5. Mental Health

a) Concept and Importance

b) Types of Conflicts and Defense Mechanisms

c) Role of Teacher in Promoting Mental Health

UNIT - V Individual Variations

1. Concept of Variation and Classroom, Implication with reference to Intelligence, Aptitude, Creativity, Emotional Stability, Social Adjustment, Self Concept and Interest.

2. Introduction to Socially disadvantaged children who are marginalized on account of class, caste, Language, ethnicity or gender, first class generation learners.

(Focus should be to understand how different socio political realities construct different childhoods Within children's lived contexts: Family, Schools, Neighborhood and Community through close Observation and interaction with children of different socio- economic and cultural backgrounds) Intelligence, Nature and Characteristics

3. Theories of Intelligence

a) J.P. Guilford Structure of Intellect

b) Howard Garden's Theory of Multiple Intelligence.

c) Daniel Goleman's Model of Emotional Intelligence.

4. Measurement of Intelligence Types of Intelligence Tests – Verbal, Non- Verbal and Performance Tests.

SESSIONAL/PRACTICUM

Any Two from the following:

Practicum no.1 is compulsory for all.

1. Administration, Scoring, Interpretation and Reporting of one Mental Ability Test and one Personality Test .Any one from the following:

2 Preparation of case history of children from early childhood to adolescence taken from different socio economic and cultural background in the context of family, schools, neighborhood and community.

3 Study of any one psychosocial issue related to adolescence (Child labour, Juvenile Delinquency, Pressure of Competition, Gender issues)

4 Study of any one issue represented and highlighted by media (sexual abuse and harassment, poverty, gender, child labour etc).

REFERENCES

1. Ambron S.R (1981) Child Development, Holt Rinehart & Winston, New york.

2. Atkinson, Richard C. etal (1983) Introduction to Psychology Harcourt Brace Johanovich inc, New york. Benjafield, J.G (1992) Cognition, Prentice hall, Englewood Cliffs.

3. Bains, Narinder Singh (2008). Shiksha Manovigyan Avam Vikas Ku Avastha, Jaipur: Jain Prakashan.

4. Bhatia, K.K. (2005). Shiksha Manovigyan ke Aadharm Ludhiana : Kalyani Publishers.

5. Blackie, J.How Children Learn in J.C Stone an F.W. Schneider (eds) (1971) Readings in the Foundations of Education vol, II Cromwell : New york.

6. Brown J.S.Collins A and Dugrid P (1989) Situated Cognition and the Culture of Learning, Educational Researcher, 32- 42

7. Chouhan, R.S. (2007). Adhigam avam Vikas Ka Manovigyan, Jaipur : Aggresen Shiksha Prakashan

8. Dweck, C. (2006). Mindset: The new Psychology of Success. Random House LLC.

9. Flavell, J.H (1963)The Developmental Psychology of Jean Piaget, Van Nostrand: New York.

10.Gardner, H (1999) The Disciplined Mind: what all Students should Understand. New york: Simon and Schuster.

11. Gardner, Howard (1989) Frames of Mind The Theory of Multiple Intelligence, Basic Books, New york

12. Gardner, Howard (1989) the Unschooled Mind Basic books. New york.

13. Hurlock, E.B (1964) Child Development , Mcgraw Hill Book co.New york, Jeanne Ellis ormrod Educational Psychology, Developing learners, fourth Edition

14. Lindgn, H.C (1980) Educational Psychology in the Classroom Oxford University press, New york.

15. Luria, A.R(1976) Cognitive Development: Its Cultural and Social Foundations. Howard University Press Cambridge mass.

16. Mangal, Dr. S.K, Mangal Shubhra, 2005, Child Development, Arya Book Depot New Delhi.

17. Mishra Mithlesh, Ahlawat Meena (2008), Jaipur : Neelkanth Pustak Mandir.

18. Mishra, Mahindra Kumar (2008). Vikasatmak Manovigyan, Jaipur : University Book House.

19. Mishra, Manju. (2008). Adhigamkarta Ka Vikas avam Shikshan Adhigam Prakirya, Jaipur : University Book House.

20. Mishra. R.C. 2010, Child Psychology. A.P.H Publishing Corporation, New Delhi.

21. Pareek, Mathureshwar, 2002, Child Development and Family Relationship, Research Publication, Jaipur.

22. Patricia A. Alexander, Phillp H.Winnie (2006) Handbook of Educational Psychology.

23. Phillpee Aives (1962) Centuries of childhood: A Sociology of Family Life, Knops, New york.

24. Piaget, J. (1997) Development and Learning. in M gauvarin & M. Cole (Eds.) readings on the development of children. New York. WH freeman & company

25. Piaget,J,Inhelder,B(1969).Psychology of Child : New York.

26. Rajoria, Arun Kumar, Arora, Preeti (2007). Adhigamkarta Ka Vikas Avam Shikshan Adhigam Prakirya. Jaipur : Kavita Prakashan.

27. Rogers, C.R (1983) Freedom to Learn (revised edition) Columbus, OH: Merrill.

28. Rosser, Rosemary A (1993) Cogntive Development Psychological and Biological Perspective, Allyn and Bacon, USA.

29. Saini, Babu Lal (2007). Shiksha Manovigyan, Jaipur : Swati Publication.

30. Santrok J.W (1999) Lifespan Development (7th edition) Boston: MC Graw Hill college sibia A (2006) life at Mirambika, NCERT, New Delhi.

31. Sarangpani M.Padma (2003) Constructing School Knowledge an Ethnography of Learning in an Indian Village, sage Publication.

32. Saraswati T. S. (1999) Adult-Child Continuity in India: in Adolescence a Myth or an Emerging Reality? in T.S. Saraswati 9Ed) culture, socialization and human development : theory research and applications in india. New Delhi Sage.
33. Sharma, R.K, Sharma, H.S, Tiwari, Aryana, 2006, Psychological Foundation of Child development, Radha Prakashan Mandir, Agra.
34. Shrivasha, D.N. Verma, Dr.Preeti 2010, Modern Experimental Psychology and Testing, Shri Vinod Pustak Mandir, Agra.
35. Shrivastava, D.N, Verma Preeti 2007, Child Psychology: Child Development Vinod Pustak Mandir, Agra.
36. Singh, Arun Kumar (1997). Uchattar Samanya Manovigyan, Delhi : Motilal Banarisidas.
37. Srivastava A.K (1998) Child Development: The Indian Perspective, NCERT, New Delhi.
38. Sturt Mary, Oakden E.C (1999) Modern Psychology and Education, Routledge.
39. Thorndike Edward L (2007) Educational Psychology, Published by READ books.
40. Verma, Rampal Singh. Adhigam avam Vikas Ke Mano-Samajik Adha, Agra : Vinod Pustak Mandir.
41. Vygotsky, L.S (1978).Mind in Society, Harvard university Press: Cambridge Chapter 6.
42. Wertsch, J.V (1986) Vygotsky and the Social Formation of Mind, Harvard University press.
43. Wolfolk, (1987) Educational Psychology, Prentice Hall, Eaglewood Cliff.
44. Woolfolk, A.E (2009) Educational Psychology (11th Edition) (My Education Lab series) Prentice Hall.

PAPER CODE-9372

Course 2- CONTEMPORARY INDIA & EDUCATION

(Including Gender, School & Society)

Objectives: Student teachers will be able to :-

1. Understand the diversified nature of Indian Society.
2. Understand the Marginalization and Inequality present in Indian Society.
3. Understand the Challenges and implications of Social diversity and inequality in school education.
4. Understand the role of Education in grooming children with respect to diversity.
5. Understand the Constitutional promises of freedom Social justice, equality and fraternity.
6. Critically examine the reflection of constitutional values in educational system.
7. Understand the policies related to education in pre and post independent india.
8. Critically examine the implementation of policies on education.
9. Understand the implications of Globalization, Privatization and Liberalization in education.
10. Develop gender sensitivity and understand the gender discrimination in family, school and society.

COURSE CONTENT

UNIT- I Indian Society & Education

1. Meaning, Nature & purpose of Education:
   a) According to different thinkers i.e,Gandhi, Tagore, Aurobindo, J.krishnamurti, Rousseau and Dewey.
   b) According to important National documents on Education i.e Education commission (1966) NPE (1986) its revision 1992, NCF (2005),
2. Concept of Social diversity, inequity and Marginalisation and role of Education to cope up with these issues.
3. Universalization of Education/RTE(2009) & its Challenges
4. Globalization, Liberalization, and Privatization and their implications in Education.

UNIT- II Education in India

1. Education in Pre Independence Period/ Macaulay's Minutes/ and major educational polices during preIndependence British Period.
2. Education in Post Independence period-
   (a) Policies regarding Education in post Independence Period [Specially NPE (1986), RTE (2009)

(b) Important national documents on Education – Education commissions (1966), NCF (2005), Learning without burden (Yashpal committee report), NCFTE (2009)

(iii) Dellors commission report – relevance to Indian Conditions

UNIT- III – Challenges in Education

1. Language policy
2. Enhancement of quality in Education and role of SSA and RAMSA in this.
3. Increasing enrollment at different stages

UNIT- IV Gender, School and Society

1. (a) Gender Sensitivity and its importance for society

(b) Gender discrimination in Family

(c) Gender discrimination in society

(d) Gender discrimination in Schools

2. Role of Education, family, media and legislation in developing gender parity.

UNIT – V - Values in Education –

1. Values: concept and classification, unity of all life and being); tolerance; Values in modern Indian context with the reference to the Indian Constitution. Rights and Duties of a citizen as stated in constitution.
2. Value Education and role of school. Human rights & danger to Social Security, Role of Education in safe guarding human rights. Activities helpful in Inculcation of values.
3. Environmental Education- Role of teacher in Promoting Conservation of Environment.
4. Education for peaceful and cooperative living.

Practicum/Sessional work

Attempt any two-(One each from following sections)

Section A

1. Term paper on any one Topic/issues related to Education
2. Two abstract of any Two articles related to Education

Section B

1. Prepare a report on Co-curricular Activities of a school supporting Environment protection.
2. Case study of any one institution with reference to gender sensitivity.
3. Prepare a report of a group discussion conducted on language Policy/ Constitutional values/ Globalization/ Libralization/ Privatization.

REFERNCES

1. Agnihotri, R.K (1995), Multillgualism as a classroom resource. In K.Heugh.A.Siegruhn,&P.Pluddemann (Eds) Multilingual education for south Africa (pp.3-7) Heinemann Educational Books.

2. Batra,P. (2005), Voice and Agency of teachers: Missing link in national curriculum framework 2005. Economic and Political Weekly, 4347-4356.

3. Chakravarti, U.(1998). Rewriting history: The life and times of Pandita Ramabai Zubaan.

4. De,A.Khera, R.Samson, M.& Shiva kumar, A.K. (2011) PROBE revisited: A report on elementary education in India. New Delhi: Oxford University Press.

5. Dewey. J (2004), Democracy and Education Courier Dover Publications

6. Freire, P (2000) Pedagogy of the oppressed Continuum

7. Ghosh,S.C (2007) History of Education in India. Rawat Publications.

8. GOI,(1966) Report of the Education Commission:Education and national development New Delhi:Ministry of Education.

9. GOI (1992,1998) National policy on education 1986 (As modified in 1992) Retrieved from http://mhrd.gov.in/sites/upload_files/mhrd/files/NPE86-mod92.pdf

10. GOI (2009) The right of Children to free and compulsory education act, 2009 Retrieved from http//mhrd.gov.in/sites/upload_files/mhrd/files/rte.pdf

11. GOI (2011) Sarva Shiksha abhyan- framework for implementation based on the right of children to free and compulsory education act, 2009. GOI Retrieved from http//www.upefa.com/upefaweb/admin/myuploads/SSA_Frame_work (revised)_9-6-2011 pdf.

12. Govinda, R,(2011) who goes to school? Exploring exclusion in Indian education Oxford University Press.

13. Govinda, R & Josephine, Y (2004) Para teachers in India:A review New Delhi: National Institute of Educational Planning and Adminstration

14. Hindustani Talimi Sangh (1938) Basic national education: Report of the Zakir Hussain commitee Sagoan, Wardha: Hindustani Talimi sangh

15. Haiah, K (1996) Why I am not a hindu :A sudra critique of Hindutwa philosophy, Culture and

political economy Samya Publications.

16. Kumar,K (2013) Politics of Education in colonial India, India: Routledge.
17. Naik, J.P,& (1982) The education commision and after. APH Publishing
18. NCERT (2005) National curriculum framework .NCERT.
19. NCERT (2006a) Position paper-National focus group on education with special needs (NCF 2005)
New Delhi: NCERT
20. NCERT (2006b) Position paper-National focus group on gender issues in the curriculam (NCF 2005)
NCERT.
21. NCERT (2006c) Position paper –National focus group on problems of scheduled caste and scheduled
tribe children (NCF2005) New Delhi:NCERT
22. NCERT (2006d) Position paper-National focus group on teaching of Indian language (NCF 2005)
New Delhi: NCERT
23. Pathak, A. (2013) Social implications of Schooling: Knowledge pedagogy and consciousness. Aakar
Books.
24. Raina, V (2010) FAQs on the right to free and compulsory education act 2009, Bharat Gyan Vigyan
Samiti, UNICEF
25. Sabyasachi, B (1997) The Mahatma and the poet: Letters and debates between Gandhi and Tagore.
National Book Trust.
26. Sykes, M (1987) The story of Nai Talim. Wardha: Nai Talim Samiti.
27. Tagore, R.(2003) Civilization and progress. In Crisis in civilization and other essays New Delhi:Rupa & Co.
28. The PROBE Team (1999) Public report on basic education in India. Delhi: Oxford University Press.
29. Zastoupil , L & Moir, M (1999) The Great Indian education debate : Documents relating to the
Orientalist Anglicist controversy, 1781-1843. Psychology Press.

Course 3 - UNDERSTANDING THE SELF

Objectives: After completion of the course, the pupil teachers will be able to:

1. Understand the development of self as a person and as a teacher.
2. Develop sensibilities, dispositions and skills to facilitate personal growth of their students in the classroom.
3. Know the development of self concept and the professional identity.
4. Develop social relational sensitivity.
5. Build resilience within to deal with conflicts.
6. Analyze self identity (one's implicit beliefs, stereotypes and prejudices resulting from gender, culture, assets and limitations of oneself).
7. Become aware of the impact of political, historical, and social forces on their identity formation.
8. Learn and practice effective communication skills.
9. Understand the philosophy of yoga.
10. Practice Yoga to enhance abilities of body and mind.

COURSE CONTENT

UNIT 1: Exploration Into Self

1. Meaning and Nature of Self and Self Concept. Role of Home, Neighborhood, Community, Peer Group, School in their development. Importance of Building social Relations.

(a) Pupil teachers are required to explore their own self, self concept and self esteem by Administering tests of self efficacy, Self concept, self esteem and self identity under the Supervision of facilitators and prepare their personality profile.

(b) Pupil Teachers will be required to administer above tests to five school students and prepare student profile. On the basis of this profile they are required to prepare a teaching strategy to Enrich self concept, classroom learning and enhance achievement of students

Note: Records of the above to be submitted for evaluation

2. Self Esteem and Self Identity: Meaning and Nature; Development process: parenting practices,

role of caste class, gender, age, religion, school, role models in the development of self esteem

and self identity. Development of Teachers Personality: role of social, cultural, Political, academic, Psychological and organisational factors.

Pupil teachers are required to:

(a) Write down biographies of the best teachers they have come across

(b) Interview Successful teachers, professionals, businessmen and prepare a report of their interview.

(c) Collect success stories of high achievers in the field of academics/ sports / athletes/ actors and

analyse them to identify their unique personality factors contributing to their success.

(d) Identify their own best contribution as a teacher, identify challenging situations they have come

across during class room teaching.

Note : Reports of the above will be presented and discussed in the group situation and to be submitted for evaluation.

3. Motivation: Meaning and importance of achievement motivation for achieving excellence. Importance of Goal Determination and Goal Achievement. Achieving self actualisation in teaching Profession.

(Mode: Workshop in Small Groups)

Identify influences of motives in his/her achievement in schools, college/jobs/personal relations. Pupil teachers will reflect on their own contribution to enrichment of their family, society and peer group.

UNIT – II Communication

Meaning, nature, types; factors influencing communication: psychological, social, organisational. Mass Communication: its impact on personality development and classroom learning. Effective listening and its role in the classroom, Characteristics of effective communication (body language, listening behaviour, responding strategies), Mastering Effective Communication.

Workshop of Pupil Teachers to restructure personality through:

(a) Analysis of one's strengths and weaknesses, beliefs, prejudices, time management, life goals,

professional commitment.

(b) Developing effective listening and observation skills. Student teachers are required to develop

in the workshop their personal strategies to enrich inner self as a teacher and stipulate its impact

on their students.

UNIT – III Philosophy and use of Yoga

Philosophy of Yoga and its role in well being, use of yoga in different contexts; importance of

Meditation; contribution to development of self.

(a) Practice of Yoga Exercises and Meditation

SESSIONAL WORK

1. Reports of the practicums of the above units.

NOTE: In this paper there will be no external examination. Internally college will conduct a written examination carrying a weightage of 10 marks and a practical examination carrying a weightage of 20 marks, Viva Voce carrying a weightage of 10 marks and 10 marks will be awarded for sessional work.

College will conduct Internally

Total Marks : 50	**Internal Assessment : 50**
Written Examination	**10 Marks**
Practical Examination	**20 Marks**
Viva – Voce	**10 Marks**
Practicum / Sessional work	**10 Marks**

REFERENCES

1. Besant, A.(2005) An Introduction to Yoga. Cosmo. New Delhi.

2. Bhatnagar, Nitin (2012) Effective Communication and soft Skills. Pearson Education India

3. Covey, Stephen R.(2008) The Leader IN ME. Free Press. New York

4. Craver,C.S & Scheier, M.F (1992) Perspective on Personality.(Second edit.) Alyn & Bacon.

Boston.

5. Eriikson, E.H. (1963) Childhood and Society.(Second Edit.)Norton. New York

6. Gilmer,B.Von Haller (1970)Psychology. Harper and Row Publishers, New York, Chapter 9

7. Harishchander Shrivastav, Diwvedi,K (1975) Samaj Manovigyan .Uttar Pradesh Hindi Sansthan,
Lukhnow

8. Kamla Ganesh & Usha Thakkar(edit.) (2005).Culture and Making of Identity in India. Sage
Publications, New Delhi

9. Khera, shiv(2005) YOU CAN WIN. Chapters 6&7. Macmillan India Ltd. New delhi.

10. Louis L.Hay (1994) The Power is Within You. Hay House, Inc.

11. Norman Vincent.You Can If You Think You Can. Prentice Hall In. London

12. Pathak,Avijit(2002) Social Implications of Schooling, Rainbow publishers ,Delhi

13. Rao,P.V.K.(1995). Scientific and Psychological Significance of Yoga.Department of Education,
BHU. Banaras.

14. Saraswati,T.S.(1999)Culture Socialisation and Human Development.Theory:Research and
Applications in India.Sage Publications, New Delhi

15. Santrock,K.G.(2007)Child Development(11th Ed).McGrawHill,New York

16. Success Stories A Reader's Digest Selection.RDIPrint and Publication PVT LTD ,Mumbai

17. Woolfolk,A.(2007)Educational Psychology (10ThEd).Allyn & Bacon ,Boston

18. Yadav, Y.P & yadav, R.(2003). Art of Yoga. New Delhi: Friends

Paper Code : 9601

FIRST YEAR

GENERAL ENGLISH

M

M:

50

(Common for Science, Social Sciences and Humanities & Commerce Faculties)

(1) Texts :

1. The Many Worlds of Literature ed: Jasbir Jain: Macmilan India.

2. Animal Farm: By George Orwell

Or

A Vendor of Sweets: By R.K. Narayan

Distribution of Marks :

Marks

1. Current English for Language skills:

15

(a) Short-answer questions (5 out of 10) each carrying 1 mark = 5 marks

(b) General questions (2 out of 4) each carrying 4 marks = 8 marks

(c) Questions on vocabulary = 2 marks

2. Animal Farm or A Vendor of Sweets:

10

(a) Two questions (out of 4) each question carrying 5 marks = 10 marks

2. Grammar :

13

(a) Tenses

3 marks

(b) Modal Auxiliaries

2 marks

(c) Phrasal Verbs

3 marks

(d) Clause (Nominal, Adjectival, Adverbial)

2 marks

(e) Use of Non-finite verbs (Gerunds, Participles and infinitives)

3 marks

3. Comprehension and Composition:

12

(a) Precis writing

5 marks

(b) Essay (about 300 words) on one topic out of four topics

7 marks

Books Recommended :

1. Pit Corder: An Intermediate English Grammar

2. Thompson and Martinet: A Practical English Grammar (ELBS - Oxford University Press)

Paper Code : 9602

FIRST YEAR

ENVIRONMENTAL STUDIES

(Credit Course)

(Compulsory for all Faculties)

The Environmental Studies (Compulsory) Examination shall consist of one theory paper of three hour duration and a field work. The student has to pass in theory as well as in field work separately.

Distribution of Marks	**Max. Marks**	**Min. Pass Marks**
Theory Paper	75	27
Field Work	25	09
Total	**100**	**36**

Pattern of question paper in the examination and distribution of marks :

The Environmental Studies (Compulsory) Examination will have a theory paper consisting two parts, A and B and a field work.

In Part A, total 10 questions will be set in the paper selecting at least one from each unit. Each question to be answered in about 50 words. All questions are compulsory. Each question carries 2.5 marks, total 25 marks.

In Part B, total 10 questions will be set, selecting at least one from each unit. Five questions have to be answered by the student selecting not more one from a unit. Each question to be answered in about 350 words. These questions carries 10 marks each, total 50 marks.

Field Work : Student will have to submit a typed/ hand written report of about 20 pages based on study of a local area of environmental interest. The report will be assessed by an internal examiner under the supervision of Dean/Principal of the College.

Suggested Books:

1. Chaudhary B.L. and J. Pandey (2004) : Environmental Studies (In Hindi), APEX Publishing House, Udaipur.

2. Purohit, S.S., Q.J. Shammi and A.K. Agrawal (2004), A Text Book of Environmental Sciences (In English), Student Edition, Jodhpur.

SYLLABUS

UNIT-1: The Multidisciplinary Nature of Environmental Studies

Definition, Scope and Importance; Need for public awareness (2 lectures).

UNIT-2: Natural Resources

Renewable and Non-renewable Resources: Natural resources and associated problems.

a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water Resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral Resources: Use and exploitation, environmental effects of extracting and using minerals resources, case studies.

d) Food Resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy Resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

f) 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 Lectures)**

UNIT-3: Ecosystem

* 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 -

(a) Forest ecosystem, (b) Grassland ecosystem, (c) Desert ecosystem, (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) **(6 lectures).**

UNIT-4 : Bio-diversity and its conservation

* Introduction-Definition: Genetic, species and ecosystem diversity.
* Biogeographically 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 of 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 lectures)**

UNIT-5 : Environmental Pollution

Definition:

* Causes, effects and control measures of : (a) Air pollution; (b) Water pollution; (c) Soil pollution; (d) Marine pollution; (e) Noise pollution; (f) Thermal pollution; (g) Nuclear hazards.

* Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.

* Role of an individual in prevention of pollution.

* Pollution case studies.

* Disaster management: floods, earthquake, cyclone and landslides. **(8 lectures)**

UNIT-6 : 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 problem and concerns. Case studies.

* Environmental ethics: Issues and possible solutions.

* Climatic 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 environment legislation

* Public awareness **(7 lectures).**

UNIT-7: 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 lectures)**

UNIT-8 : Field Work

* Visit to a local area to document environmental assets - river/forest/grassland/hill/mountain
* Visit to a local polluted site - Urban/Rural/ Industrial/Agricultural
* Study of common plants, insects, birds
* Study of simple ecosystems - pond, river, hill slopes etc. (Field work Equal to **5 lecture** hours).

COURSE CURRICULAM AND SYLLABUS OF
FOUR YEAR INEGRATED COURSE
PHYSICS
COURSE CURRICULAM

Paper Code	Paper	Nomenclature	Lectures	Duration of Exam	Max. Marks	Min. Marks
1161	**I**	Mechanics of Particles, Rigid bodies and Continuous Media	60 hrs	3hrs	**50**	**18**
1162	**II**	Oscillations, Waves and Acoustics	60 hrs	3hrs	**50**	**18**
1163	**III**	Electricity and Magnetism	60 hrs	3hrs	**50**	**18**
1164	**IV**	Practical	120 hrs	6 hrs	**50**	**18**

Each theory paper in the annual examination shall have three sections.

Section A shall contain one compulsory question of 5 marks having 10 parts. Two parts shall be set from each unit. The candidate is required to answer each part in about 20 words.

Section B shall contain five compulsory questions of 5 marks each with internal choice .One question with internal choice will be set from each unit .The answer may be given in approximately 250 words.

Section C shall contain four descriptive questions covering all units and candidate has to answer any two questions of ten marks each. The answer may be given in approximately 500 words. There can be two parts in a question from this section.

In total the candidate has to answer eight questions in each theory paper.

Paper Code : 9341

FIRST YEAR B.Sc.B.Ed. INTEGRATED COURSE

PAPER-I

MECHANICS OF PARTICLES, RIGID BODIES AND CONTINUOUS MEDIA

UNIT – I

Laws of motion, conservation of energy and momentum, transformation equations for rotating frame, centripetal and Coriolis accelerations, Coriolis force, Coriolis force due to earth's rotation – experimental demonstration by Focualt pendulum.

Motion under a central force, conservation of angular momentum, Kepler's laws.

UNIT – II

Fields and potential, gravitational field and potential due to spherical bodies, Gauss's and Poisson's equations, gravitational self energy.

Two body problem, reduced mass, scattering and scattering cross sections, illustrations, Rutherford scattering by hard spheres, centre of mass and laboratory reference frames, binary stars.

UNIT – III

System of particles, centre of mass, calculation of centre of mass of regular bodies, angular momentum, equations of motion, conservation theorems for energy, momentum and angular momentum, system of variable mass, elastic and inelastic collisions, rigid body, degrees of freedom, Euler's theorem.

UNIT – IV

Molecular rotations (as rigid bodies), moment of inertia, di and tri atomic molecules, intrinsic spin, precessional motion, motion of top, gyroscope. Elastic constants for an isotropic solid, their inter relation, torsion of a cylinder, bending of beam, applications to cantilever.

UNIT – V

Kinematics of moving fluid, equation of continuity, Euler's law for fluidity.

Viscous fluids, streamline and turbulent flow, flow through a capillary tube, Poisvilles law, Reynold's number, Stoke's law, theory of rotation viscometer, effect of temperature and pressure on the viscosity of liquids.

Text and Reference Books:

1. E.M. Purcell, Editor, Berkeley Physics Course, Vol. 1, Mechanics, McGraw Hill.

2. R.P. Feynmann, R.B. Lighton, M. Sands, The Feynmann Lectures in Physics, Vol.I, B.I. Publications, Bombay, Delhi, Calcutta, Madras.

Paper Code : 9342

PAPER-II

OSCILLATIONS, WAVES AND ACOUSTICS

UNIT - I

Free oscillations of simple systems: Equilibrium; concept of potential well, small oscillations approximation, solutions, linear and transverse oscillations of a mass between two springs, diatomic molecule, reduced mass concept.

Damped and forced oscillations: Damped oscillations; critical damping, Q of an oscillator. Forced oscillator with one degree of freedom; Transient and steady state oscillations, resonance energy absorption, low and high frequency responses.

UNIT - II

Free oscillations of system with two degrees of freedom: Two dimensional oscillator; normal modes, longitudinal and transverse oscillation of coupled masses, energy transfer between modes, coupled pendulum.

Fourier analysis: Fourier series and Fourier coefficients; simple examples (square wave, saw-tooth wave, half and full wave rectifier), use of exponential representation for harmonic oscillations, expression for Fourier coefficients. Non-periodic disturbance; representation by Fourier integral, Fourier transform. Case of a wave train of finite length, constancy of $\Delta x \, \Delta k$ (the uncertainty product).

UNIT - III

Wave equation: Waves in a one-dimensional chain of particles; classical wave equation; wave velocity, boundary conditions and normal modes, dispersion relations, dispersion waves, acoustic and optical modes.

Waves in continuous media: Speed of transverse waves on a uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves, typical measurements, dispersion in waves, group velocity and phase velocity, their measurements.

Superposition of waves: Linear homogenous equations and the superposition principle, interference in space and energy distribution; beats and combination tones.

UNIT -IV

Ultrasonics: Production, detection, and applications of ultrasonic waves

Vibrations in bounded systems: Normal modes of a bounded system; harmonics, the quality of sound, Chladni's figures, Vibration of a drum. Noise and Music; Limits of human audibility; intensity and loudness, bel and decibel. Music scale and musical instruments.

UNIT - V

Reflection, refraction, and diffraction of sound:

Acoustic impedance of a medium, percentage reflection, and refraction at a boundary, impedance matching for transducers. Diffraction of sound; principle of a sonar system, sound ranging.

Applied acoustics: Transducers and their characteristics, recording and reproduction of sound, measurement of frequency, velocity, waveform, and intensity. The acoustics of halls, reverberation period, Sabine's formula.

Text and Reference Books:

1. Waves and Oscillations, Berkley Physics Course Vol. III
2. Vibrations and waves, I.G. Main (Cambridge University Press)
3. The Physics of Vibrations and Waves, H.J. Pain, McMillan (1975).

Paper Code : 9343

PAPER-III

ELECTRICITY AND MAGNETISM

UNIT – I

Electric Field: Coulomb's law, unit of charge (SI and other systems of units). Conservation and quantization of charge. Field due to different charge distributions, monopole, dipole, quadrupoles, line charge, sheet charge. Torque on a dipole in uniform field and non-uniform fields, flux of an electric field. Gauss's law - applications to deduce **E** fields, force per unit area on the surface of a charged conductor.

Potential: Line integral of electric field and electrical potential. Field as the gradient of potential. Potential energy of a system of charges and its calculation in various configurations. Field equations for **E** in vacuum. Energy associated with **E** field. Differential form of Gauss's law: Poisson's equation, Laplace's equation, boundary conditions and uniqueness theorems.

Electric field around conductors: induced charges, field and potential inside a conductor, field near the surface of a conductor, method of images.

UNIT – II

Electric fields in matter: atomic and molecular dipoles, induced dipoles, polarizability tensor, electronic and molecular contributions. Electrical field caused by polarized matter, **E** and **D** fields, permittivity, diele ctric constant. Capacitor filled with dielectric, field equations in presence of dielectric. The field of a polarized sphere, dielectric sphere in a uniform field. Energy in dielectric systems. Polarizability and susceptibility, frequency dependence of polarizability, Claussius-Mossotti equation.

Magnetic filed: Magnetic field **B** seen through Lorentz force on a moving charge, unit for B field, magnetic dipoles in atoms and molecules, gyromagnetic ratio. Magnetic field due to currents: Biot and Savart's law. Field equations in magnetostatics, Ampere's law. Fields due to a straight wire, magnetic dipole, circular current and solenoid. Magnetic fields in matter. Magnetizing current, magnetization vector, **H** and **B** fields, magnetic permeability, susceptibility. Comparison of magnetostatics and electrostatics.

UNIT – III

Electrical current: current density and current; nonsteady currents and continuity equations. Electrical conductivity, resistivity, conductance and their temperature dependence. Thermo electric current and dark current, non-ohmic circuitry, thermistor. Varying current. Rise and decay of currents in LR and CR circuits, time constant, integrating and differentiating circuits, electrical shielding. Study of a discrete LC transmission line.

UNIT – IV

Alternating currents: Skin effect for resistance at high frequencies, complex impedance, reactance, impedances of LCR series and parallel circuits, resonance, Q factor, power dissipation and power factor. AC bridges: Anderson's ,deSauty's and Owens bridges, Self and mutual inductance. Measurement of mutual inductance by Carry Foster Method, Coupled circuits and Transformers.

UNIT – V

Ballistic Galvanometer (moving coil type), its distinction from beat type. B.G. differential equation and its solution under different conditions of damping. Critical damping, over damping. Logarithmic decrements, charge sensitivity, current sensitivity, determination of B using search coil and B.G. Determination of high resistance using B.G. Factors for sensitivity. B.G. constant. Measurement of mutual inductance by Carey Foster's bridge by B.G. Measurement of small resistance by Kelvin's double bridge.

Text and Reference Books:

1. E.M. Purcell, Ed. Berkely Physics Course, Vol. 1, Electricity and Magnetism McGraw Hill.
2. D. Halliday and R. Resnick, Physics, vol. 2, Wiley Eastern, New Delhi.
3. D.J. Griffiths, Introduction to Electrodynamics, Prentice Hall of India.
4. Reitz and Milford, Electricity and Magnetism, Addison Wesley.
5. A.S. Mahajan and A.A. Rangawala , Electricity and Magnetism, Tata McGraw Hill.
6. A.M. Portis Electromagnetic Fields
7. S.S. Atwood, Electricity and Magnetism, Dover publication.
8. A.F. Kip, Fundamentals of Electricity and Magnetism, International Student Edition, McGraw Hill and Kogakusha,

1969

Paper Code : 9344

PAPER-IV

PHYSICS PRACTICALS

Note : Students are expected to perform sixteen experiments in all taking the eight experiments from each section. One experiment from section A and one from section B will be set in the examination paper.

The distribution of marks in the practical examination will be as follows:

(i) Two experiments	30 Marks

For each experiment, distribution of marks will be as follows:

Figure :	2
Formula/Theory :	2
Observation :	7
Calculation and Result :	3
Precautions :	1
(ii) Viva voce	10
(iii) Records	10
Total	**50 Marks**

LIST OF EXPERIMENTS

Section-A

1. Determination of elastic constants Y, □ , □ □ and K by Searle's method.
2. Determination of thermal conductivity 'K' of a bad conductor by Lee's method.
3. Determination of J by Callender and Barne's method.
4. Study of temperature variation of surface tension by Jaegers method.
5. Study of free fall of a body: use of a digital timer to get time and velocity at different depth and analysis.
6. Study of collision in two dimension
7. Kater's pendlum, precise setting, analysis and determination of value of acceleration due to gravity 'g' at a place.
8. Study of damping of a bar pendulum under various kinds of damping mechanisms.
9. To determine coefficient of damping k ,relaxation time T and quality factor of a damped SHM using a simple

   pendulum.
10. Study of dependence of period of oscillations of a spring or rubber band on mass and spring constant.

11. To determine the velocity of sound in air at room temperature with Kundt's tube.

12. Using scattering to deduce the nature of potential hump or well (two dimensional)

13 Study of laws of parallel and perpendicular axes for estimation of moment of inertia.

14. Computer simulation of equations of motion for a system of particles.

15. Computer simulation of molecular rotations, as rigid bodies.

16. Study of motion of a top and a gyroscope.

17. Study of torsion of a wire; dependence on radius, length, torque and material (static method)

18. To determine the modulus of rigidity of the material of a wire by statistical method using Bortan's apparatus

19. To determine the value of modulus of rigidity of the material of a given wire by dynamical method using Maxwell's needle

20. Study of flow of liquids through capillaries: laminar and turbulent flow stages, capillaries

21. To determine the coefficient of viscosity of water by Poisevill's method

22. Studying the fall of solids through a liquid.

23. To determine the coefficient of viscosity of a liquid (glycerene or castor oil) by Stoke's method

24. Study of air flow through a capillary : U- tube with a long capillary fitted on one arm, mercury level difference pushing air.

25. To determine Poisson's ratio of rubber

SECTION -B

1. Calibration of Carey Fosters bridge wire and determination of the specific resistance of the material of the given wire.

2. Measurement of thermo e.m.f.

3. To study growth and decay of current in R.C. circuit and determine the time constant.

4. To determine impedance of L-R circuit and find phase relation ship in current and voltage.

5. To determine the constants of a ballistic galvanometer. Current and charge sensitivity, time period, log decrement and galvanometer resistance.

6. To determine intensity of magnetic field using search coil and ballistic galvanometer.

7. To determine high resistance by method of leakage. Measure leakage resistance of a condenser.

8. To determine low resistance by Kelvin's double bridge.

9. Determination of dielectric constant of a given liquid.

10. To determine inductance of a coil using Anderson's method.

11. Desauty's bridge method for comparison of two capacitors.

12. To determine mutual inductance by Carry Foster's Method

13. Study of the impedance of a capacitor of varying frequencies to measure C.

14. Response curve for LCR circuits series resonance.
15. Study of a discrete LC transmission line.
16. Response curve for LCR circuit parallel resonance
17. Measurements of electric charge and related quantities using an electrometer.
18. Study of potential distribution in a given geometrical configuration.
19. Mapping of electric fields for specified configurations.
20. Study of magnetic field using a vibration magnetometer.
21. Study of the rise and decay of current in a RL circuits.
22. Characteristics of a choke.
23 Study of the impedance of an inductor at varying frequencies to measure R and L

FIRST YEAR B.Sc.B.Ed. INTEGRATED COURSE

CHEMISTRY

The examination shall consist of three theory papers and one practical.

Paper	Course	Hrs/week	M. Marks
Paper -I	Inorganic Chemistry	2	50
Paper - II	Organic Chemistry	2	50
Paper –III	Physical Chemistry	2	50
	Practical	4	50

Paper Code : 9345

PAPER-I

INORGANIC CHEMISTRY

Time-3 Hrs.

M.M. 50

NOTE: The paper will be divided into THREE sections.

Section-A Ten questions (short type answer) two from each Unit will be asked. Each question will be of half mark and the candidates are required to attempt all questions.

Total 5 marks

Section-B Five questions (answer not exceeding 250 words) one from each Unit with internal choice will be asked and the candidates are required to attempt all questions. Each question will be of 5 marks. **Total 25 marks**

Section-C Four questions may be in parts covering all the five Units (answer not exceeding 500 words) will be asked. The candidates are required to attempt any TWO questions. Each question will be of 10 marks. **Total 20 marks**

UNIT - I

Covalent Bond- Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization and shapes of simple inorganic molecules and ions. Valence Shell Electron Pair Repulsion (VSEPR) theory, regular and deviation from regular geometry. MO theory, homo-nuclear and heteronuclear (CO, NO, HF and HCl) diatomic molecules, multicenter bonding in electron deficient molecules, bond strength and bond energy, percentage ionic character from dipole moment and electronegativity difference.

Ionic Solids - Ionic structures, radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy and Born-Haber cycle, solvation energy and

solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule. Metallic bond - free electron, valence bond and band theories**.**

Weak Interactions- Hydrogen bonding, Van der Waals forces.

UNIT II

s -Block Elements - Comparative study, diagonal relationships, salient features of hydrides, salvation and complexation tendencies including their function in biosystems, an introduction to metal alkyls and aryls.

Chemistry of Noble Gases-History of discovery, separation of inert gases, chemical properties of the noble gases, chemistry of xenon, structure and bonding in xenon compounds.

UNIT -III

Group-13- General properties, oxides, hydroxides, halides and hydrides of boron, diborane and higher boranes, borohydrides, borazine, oxyacids of boron, borax and borax bead test .

Group-14- General properties, inert pair effect, halides, oxides, silicates, silicones, graphitic compounds, carbides, cyanides and carbonyls, brief idea of fullerenes.

Group-15- General properties, hydrides, azides, halides, oxides and oxyacids of phosphorous, nitrogen fixation, fertilizers.

UNIT - IV

Group-16 - General properties, polymorphism, hydrides, halides, oxides and oxyacids of sulphur, thiosulphuric acid and salts, thionic acids and their salts, tetrasulphur tetranitride.

Group-17 - General properties, hydrogen halides, oxides and oxyacids of halogens, interhalogen compounds, polyhalides, basic properties of halogens.

UNIT - V

Non -Aqueous Solvents - Physical properties of a solvent, types of solvents and their general characteristics, Differentiating and leveling solvents, reactions in non-aqueous solvents with special reference to liquid NH_3 and liquid SO_2.

Acids and Bases - Arrhenius, Bronsted - Lowry, Lux - Flood, solvent system and Lewis concepts of acid and bases, Usanovitch definition.

Books Recommended

1. Concise Inorganic Chemistry: J. D. Lee
2. General Inorganic Chemistry: J. A. Duffy, Longman (2nd Ed.)
3. Principles of Inorganic Chemistry: B. R. Puri and L. R. Sharma
4. Basic Inorganic Chemistry: F.A.Cotton and G. Wilkinson, Wiley Eastern
5. Molecular Geometry : R. J. Gillespie, Van Nostrand Reinhold.
6. Inorganic Chemistry (Hindi Ed.): Suresh Ameta, A. Sharma and M. Mehta, Himanshu Pub.

Paper Code : 9346

PAPER-II

ORGANIC CHEMISTRY

Time-3 Hrs.

M.M. 50

NOTE : The paper will be divided into THREE sections.

Section-A Ten questions (short type answer) two from each Unit will be asked. Each question will be of half mark and the candidates are required to attempt all questions.

Total 5 marks

Section-B Five questions (answer not exceeding 250 words) one from each Unit with internal choice will be asked and the candidates are required to attempt all questions. Each question will be of 5 marks. **Total 25 marks**

Section-C Four questions may be in parts covering all the five Units (answer not exceeding 500 words) will be asked. The candidates are required to attempt any TWO questions. Each question will be of 10 marks. **Total 20 marks**

UNIT-I

Structure and Bonding - Localized and delocalized chemical bond, Van der Waals interaction, charge transfer complexes, resonance, hyperconjugation, aromaticity, electromeric, inductive and field effects, hydrogen bonding.

Mechanism of Organic Reactions - Curved arrow notation, drawing electron movements with arrows, half-headed and double- headed arrows, types of organic reactions, energy considerations.

Reactive Intermediates - Carbocations, carbanions, free radicals, carbenes, arynes and nitrenes, their formation and stabilities.

Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and stereochemical studies).

UNIT-II

Stereochemistry of Organic Compounds – Concept of isomerism , types of isomerism.

Optical Isomerism- Elements of symmetry, molecular chirality, enantiomers, stereogenic centre, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centers, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization.

Relative and absolute configuration, sequence rules, D and L, R and S systems of nomenclature.

Geometric isomerism-determination of configuration of geometric isomers. E and Z system of nomenclature, geometric isomerism in oximes and alicyclic compounds.

Conformational isomerism-conformational analysis of ethane and n-butane; conformations of cyclohexane, axial and equitorial bonds, conformation of mono substituted cyclohexane derivatives. Newman projection and Sawhorse formulae, Fischer and Flying Wedge formulae.

Difference between configuration and conformation.

UNIT-III

Alkanes: General methods of formation, physical & chemical properties. Mechanism of free radical substitution in alkanes with reference to halogenation, orientation, reactivity and selectivity.

Cycloalkanes - Nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitation, ring strain in small rings (cyclopropane and cyclobutane), theory of strainless rings, the case of cyclopropane ring : banana bond.

Alkenes, Dienes and Alkynes - Brief introduction of alkenes, their formation with reference to mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides, regioselectivity in alcohol dehydration. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes.

Chemical reactions of alkenes- mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration- oxidation, oxymercuration-reduction, epoxidation, ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$, polymerization of alkenes, substitution at the allylic and vinylic positions of alkenes, industrial applications of ethylene and propene.

Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes, structure of allenes and butadiene, methods of formation, polymerization, chemical reactions - 1,2 and 1,4 - additions, Diels - Alder reaction.

Alkynes: Acidity of alkynes, mechanism of electrophilic and nucleophilic addition reactions, hydroboration, metal - ammonia reductions, oxidation and polymerization.

Unit - IV

Arenes and Aromaticity - Nomenclature of benzene derivatives, the aryl group, aromatic nucleus and side chain, structure of benzene, molecular formula and Kekule structure, stability and carbon - carbon bond lengths of benzene, resonance structure and M. O. picture.

Aromaticity: The Huckel rule, aromatic ions. Aromatic electrophilic substitution: General pattern of the mechanism, role of □ □ and □ □ complexes. Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel -Craft reaction. Energy profile diagrams. Activating and deactivating substituents, orientation and ortho-para ratio. Side chain reactions of benzene derivatives. Birch reduction, Methods of formation and chemical reactions of alkylbenzenes, alkynylbenzene and biphenyl.

UNIT -V

Alkyl and Aryl Halides - Nomenclacture and classes of alkyl halides, methods of formation, chemical reactions, mechanism of nucleophilic substitution reactions of alkyl halides, S_N2 and S_N1 reactions with energy profile diagrams, factors affecting S_N2 and S_N1 reactions**.**

Haloform reaction, Freons.

Methods of formation of aryl halides, nuclear and side chain reactions, the addition - elimination and elimination - addition reaction, mechanisms of nucleophilic aromatic substitution reactions.

Relative reactivites of alkyl halides v/s allyl, vinyl and aryl halides. synthesis and uses of DDT and BHC.

Books Recommended

1. A Text Book of Organic Chemistry: K. S. Tiwari, S. N. Mehrotra and N. K. Vishnoi.
2. Modern Principles of Organic Chemistry: M. K. Jain and S.C. Sharma
3. A Text Book of Organic Chemistry: (Vol. I & II) O. P. Agarwal,
4. A Text Book of Organic Chemistry: B. S. Bahl and Arun Bahl.
5. A Text Book of Organic Chemistry: P. L. Soni.
6. Organic Chemistry: (Vol. I, II & III) S. M. Mukherji, S. P. Singh and R.P.Kapoor, Wiley Eastern Ltd.

(New Age International)

7. Organic Chemistry, Morrison & Boyd, Prentice Hall.
8. Organic Chemistry (Hindi Ed.):Suresh Ameta, P. B. Punjabi and B. K Sharma, Himanshu Pub.

Paper Code : 9347

PAPER-III

PHYSICAL CHEMISTRY

Time-3 Hrs.

M.M. 50

NOTE : The paper will be divided into THREE sections.

Section-A Ten questions (short type answer) two from each Unit will be asked. Each question will be of half mark and the candidates are required to attempt all questions.

Total 5 marks

Section-B Five questions (answer not exceeding 250 words) one from each Unit with internal choice will be asked and the candidates are required to attempt all questions.

Each question will be of 5 marks.

Total 25 marks

Section-C Four questions may be in parts covering all the five Units

(answer not exceeding 500 words) will be asked. The candidates are required to attempt any TWO questions. Each question will be of 10 marks.

Total 20 marks

UNIT - I

Mathematical Concepts - Logarithmic relations, curve sketching, linear graphs and calculation of slopes, differentiation of function like k_x, e_x, x_n, sin x, log x, maxima and minima, partial differentiation and reciprocity relations, integration of some useful/ relevant functions, permutations and combinations, factorials, probability.

Computers - General introduction to computers, different components of a computer, hardware and software, input-output devices, binary numbers and arithmetic, introduction to computer languages, programming operating systems.

UNIT - II

Gaseous State - Postulates of kinetic theory of gases, deviation from ideal behavior, Van- der Waals equation of state.

Critical Phenomena - PV isotherms of real gases, continuity of states, the isotherms of Van der Waals equation, relationship between critical constants and Van der Waals constants, the law of corresponding states, reduced equation of state.

Molecular Velocities - Root mean square, average and most probable velocities, qualitative discussion of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter, liquefaction of gases (based on Joule - Thomson effect).

Liquid State - Intermolecular forces, structure of liquid (a qualitative description).

Liquid Crystals - Difference between liquid crystal, solid and liquid, classification, structure of smetic,

nematic and cholestric phases, theory of liquid crystals and its applications, thermography and seven segments cell.

UNIT-III

Solid State - Definition of space lattice, unit cell, Bravais lattices.

Laws of crystallography- (i) Law of constancy of interfacial angles (ii) Law of rationality of indices, Weiss and Miller indices (iii) Law of symmetry, symmetry elements in crystals, classification of crystals, X-ray diffraction by crystals, derivation of Bragg equation, determination of crystal structure of NaCl, KCl and CsCl (Laue's method and powder method).

Colloidal State - Definition of colloids, classification of colloids.

Solids in liquid (sols): Properties - kinetic, optical and electrical, stability of colloids, protective action, Hardy - Schulze law, gold number.

Liquids in Liquid (emulsions): Types of emulsions, preparation, emulsifier,

Liquids in solid (gels)- classification, preparation and properties, inhibition, general applications of colloids.

UNIT- IV

Nuclear and Radiochemistry - Elementary idea of nucleus, nuclear forces, packing fraction, mass defect and binding energy, nuclear fission and fusion reactions, calculation of Q - values of nuclear reactions, liquid drop and shell models of nucleus, theory of radioactivity, G. M. Counter, half life period, average life, radioactive disintegration, radioactive steady state, group dis-placement law, radioactive series, separation and identification of isotopes, application of radioactivity and radioactive tracers.

UNIT-V

Atomic Structure - Dual nature of electron, De Broglie equation, Davisson and Germer experiment, Heisenberg

uncertainty principle, Schrodinger wave equation, significance of □ □ and □2, probability distribution curves, shapes of s, p and d - orbitals, Zeeman and Stark effects.

Physical Properties and Molecular Structure -

Physical properties of liquids, vapour pressure, measurement of vapour pressure, heat of vaporization, Trouton's rule. Surface tension, measurement of surface tension. Viscosity and its measurement, effect of temperature on the surface tension and viscosity. use of these properties in determination of chemical constitution.

Books Recommended:

1. Principles of Physical Chemistry: B. R. Puri and L. R. Sharma.
2. A Text Book of Physical Chemistry: A. S. Negi and S. C. Anand.
3. Physical Chemistry, Pt. I & II : C.M. Gupta, J.K. Saxena and M. C. Purohit.
4. Physical Chemistry (Hindi Ed.) : Suresh Ameta, R.C.Khandelwal, R. Ameta & J. Vardia, Himanshu Pub.
5. Computers and Applications to Chemistry, Ramesh Kumari, Narosa Publishing House Pvt. Ltd.

Paper Code : 9348

FIRST YEAR CHEMISTRY

PRACTICALS

TIME: 5 Hrs.(one day)

M.M. 50

Distribution of Marks

Marks

Exercises-

1. Semi-micro Analysis of Inorganic mixture containing five radicals (excluding Na^+ and K^+).

10

2. (i) Detection of extra elements (N, S, and halogen) if any and functional groups in given simple organic compounds.

7

(ii) Purification of the given organic compounds by crystallisation (charcoal), sublimation and determination of its m.p.

7

OR

Determination of mixed melting points using ureacinnamic acid mixtures of given compositions.

3. ONE physical Chemistry experiment

10

4. Viva- Voce **8**

5. Records **8**

Total 75 Marks

List of Experiments:

1. Semi-micro Analysis of Inorganic mixture: The mixture shall contain **Five** radicals at least two cations & two anions) soluble in water or in HCl. Two cations of the same group except II A & II B may be given. Not more than one interfering radical may be given. Interfering radical may not be given with typical anion combinations.

2. (i) Detection of extra elements (N,S, and halogen) if any and functional group in given simple organic compounds. (one organic compound from the following list be given for identification). Carboxylic acids, Phenols, Alcohols, Carbohydrates, Aldehydes, Ketones, Nitro Compounds, Amino compounds, Anilides, Amides, Esters, Thioamide, Hydrocarbons, Halogen containing compounds

(ii) Crystallization:

Concept of induction of crystallization

Phthalic acid from hot water (using fluted filter paper and stemless funnel)

Acetanilide from boiling water

Naphthalene from ethanol

Benzoic acid from water

Decolourisation and crystallization using charcoal

Crystallization and decolourisation of impure naphthalene (100 g of naphthalene mixed with 0.3 of Congo Red using 1 g decolourising carbon) from ethanol.

Simple Sublimation : Camphor, Naphthalene, Phthalic acid and Succinic acid.

Mixed Melting Point determination

Urea- Cinnamic acid mixture of various compositions (1:4, 1:1, 4:1)

3. Physical Chemistry Experiments- Any one of the following experiments may be given in the examination.

Distribution Law

(i) To study the distribution of iodine between water and CCl_4.

(ii) To study the distribution of benzoic acid between benzene and water.

(iii) To study the distribution of acetic acid between benzene and water

Colloids

To prepare arsenious sulphide sol and compare the precipitating power of mono-, bi- and trivalent anions.

Viscosity and Surface Tension

(i) To determine the percentage composition of a given mixture (non interacting systems) by viscosity method.

(ii) To determine the percentage composition of a given binary mixture by surface tension method

(iii) To determine the parachor value of $-CH_2-$ group.

(iv)To determine the rheochor value of $-CH_2-$ group.

Transition Temperature

(i) Determination of the transition temperature of the given substance by thermometric/dialometric method (e.g.: $MnCl_2.4H_2O$, $SrBr_2.2H_2O$)

Thermochemistry

(i) To determine the solubility of benzoic acid at different temperatures and to determine ΔH of the dissolution process

(ii) To determine the enthalpy of neutralisation of a weak acid/ weak base versus strong base/ strong acid and to determine the enthalpy of ionization of the weak acid/weak base

(iii) To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born- Haber cycle.

Books Recommended:

1. Practical Chemistry - Giri, Bajpai and Pandey, S. Chand & Co. Ltd. New Delhi

2. Laboratory Manuel in Organic Chemistry, R.K. Bansal, Wiley Eastern

3. Experimental Organic Chemistry Vol.I & II, P.R. Singh, D.S. Gupta & K.S. Bajpai, Tata McGraw Hill.

4. Experiments in Physical Chemistry- J.C. Ghose, Bharti Bhawan

5. Experiments in General Chemistry, N.R. Rao & U.C. Agarwal, Eastern Press

6. Practical Chemistry- Suresh Ameta & P.B. Punjabi, Himanshu Publication.

FIRST YEAR B.Sc.B.Ed.INTEGRATED COURSE

ZOOLOGY

The first year TDC examination shall consist of three theory papers, each of three hours duration and a practical examination of five hours duration.

Marks

Paper – I	Life And Diversity Of Animals-I (Invertebrates)	50
Paper – II	Cell Biology	50
Paper –III	Developmental Biology	50
Practical		50

Pattern of question paper in the annual examination and distribution of marks:

Each theory paper in the annual examination shall have three sections i.e. A, B, and C. **In section A,** total 10 questions will be set in the paper, selecting at least two from each unit. These questions to be answered in a word or so. All questions are compulsory. Each question carries 0.5 mark, total 05 marks.

In section B, there shall be total 10 questions, selecting two questions from each unit, five questions to be answered by the student selecting at least one from each unit. Answer should be given in approximately 250 words. Each question carries 05 marks, total 25 marks.

In section C, 04 descriptive type questions will be set in the examination paper from five units of the syllabus of the paper, selecting not more than one question from a unit. Each question may have two sub divisions. Students are required to answer any two questions approximately in 500 words. Each question is of 10 marks, total 20 marks.

Paper Code : 9349

FIRST YEAR B.Sc.B.Ed.INTEGRATED COURSE

ZOOLOGY

PAPER-I

LIFE AND DIVERSITY OF ANIMALS-I

(INVERTEBRATES)

Duration : 3 hours

M.M. 50

UNIT- I

1 General characters and classification of phylum Protozoa upto orders with examples and their economic importance.

2 Type study-*Paramecium, Plasmodium,* Pathogenecity of *Plasmodium*.

3 Parasitic protozoans : Pathogenesis and morphology of *Entamoeba histolytica, Trichomonas vaginalis, Leishmania tropica, Trypanosoma gambiense*

UNIT-II

4 General characters and classification of phylum Porifera upto orders with examples and their economic importance.

5 Type study-*Sycon*

6 Canal system in sponges.

7 General characters and classification of phylum Coelenterata upto orders with examples.

8 Type study-*Metridium*.

9 Corals and coral reefs - their formation, kinds and importance. Polymorphism in Coelenterates, Metagenesis.

UNIT-III

10 General characters and classification of phylum Platyhelminthes and Aschelminthes upto orders with examples.

11 Type study –*Fasciola hepatica, Ascaris lumbricoides*.

12 Helminth parasites in relation to human diseases, parasitic adaptations of trematodes, cestodes and nematodes.

UNIT-IV

13 General characters and classification of phylum Annelida & Arthropoda upto orders with examples.

14 Type study-*Nereis, Palaemon, Schistocerca*.

15 Metamerism, pseudocoelom, trochophore larva.

UNIT-V

16 General characters and classification of phylum- Mollusca, Echinodermata and Hemichordata upto orders with examples.

17 Type Study – *Pila, Asterias, Balanoglossus*

18 Echinoderm larvae; Affinities of Hemichordata

Paper Code : 9350

FIRST YEAR B.Sc.B.Ed.INTEGRATED COURSE

PAPER-II

CELL BIOLOGY

Duration : 3 hours

M.M. 50

UNIT -I

1 The Cell: Discovery of cell, basic properties of cell, diversity of cell size and shape, cell theory.

2 Prokaryotic cell : Characteristics and structure.

3 Cellular macromolecules: Proteins, carbohydrates, lipids.

UNIT -II

4 Centrioles and basal bodies.

5 Cilia and flagella.

6 Cytoplasmic skeleton : Microfilaments and microtubules.

7 Plasma membrane: Fluid mosaic model, functions of plasma membrane viz. Endo- and exocytosis, active and passive transport.

UNIT -III

8 Shape, size, distribution, chemical nature and functions of following:

(a) Endoplasmic reticulum.

(b) Golgi complex.

(c) Lysosomes.

(d) Mitochondria.

UNIT -IV

9 Nucleus and nucleolus: Structure, chemical nature and functions.

10 Nucleic acids: Watson and Crick model of DNA, chemical nature of DNA, types of DNA, replication of DNA, different types and chemical nature of RNA, Ribosomes.

11 Elementary knowledge of protein synthesis.

UNIT -V

12 Brief idea of cell cycle. General description of mitosis and meiosis.

13 An elementary idea of cell transformation and cancer.

14 An elementary idea of cellular basis of immunity.

15 Methods in cell Biology.

(a) Elementary idea of techniques in cell biology: Light, electron and fluorescence microscopy.

(b) Elementary idea of cell culture.

Paper Code : 9351

FIRST YEAR B.Sc.B.Ed.INTEGRATED COURSE

ZOOLOGY

PAPER-III

DEVELOPMENTAL BIOLOGY

Duration : 3 hours

M.M. 50

UNIT-I

1 Aima and scope of developmental biology. Historical review and concepts of Embryology.

2 Sexual and asexual reproduction.

3 Neuroendocrine regulation of reproductive organs (hypothalamo-hypophysial axis only).

UNIT-II

4 Gametogenesis: Spermatogenesis and structure of sperm, oogenesis and structure of ovum, types of ova.

5 Fertilization: Events of fertilization, mechanism of sperm transfer, polyspermy, preventing mechanisms.

6 Errors in fertilization and significance of fertilization.

7 Parthenogenesis.

UNIT-III

8 Cleavage: Patterns and planes of cleavage.

9 Blastulation: Types of blastula.

10 Gastrulation : Types, mechanism, fate maps, morphogenetic cell movement and their significance in gastrulation.

UNIT-IV

11 Elementary knowledge of primary organizer.

12 Embryonic induction, concept of competance.

13 Determination, differentiation and growth.

14 Regeneration.

UNIT -V

15 Extra embryonic membranes: Development and functions.

16 Placentation: Definition, types, classification on the basis of morphology and histology. Functions of placenta.

Paper Code : 9352

FIRST YEAR B.Sc.B.Ed.INTEGRATED COURSE

ZOOLOGY PRACTICAL

Duration : 5 hours

M.M. 50

S.No	Exercise	Regular
1	Major dissection	**10**
2	Cell Biology/Developmental Biology exercise	**05**
3	Mounting/Slide preparation	**04**
4	Spots (10)	**15**
5	Viva-voce	**8**
6	Record	**8**
Total		**50**

1. General survey of invertebrates (museum specimens) : The student is required to know classification, habit and habitat, economic importance etc.

A Protozoa : *Entamoeba, Polystomella, Monocystis, Euglena, Noctiluca, Leishmania, Trichomonas, Trypanosoma, Nyctotherus, Paramecium, Vorticella*, various stages of *Plasmodium.*

B Porifera : *Scypha, Hyalonema, Euplectella, Spongilla, Euspongia.*

C. Coelenterata : *Physalia, Porpita, Aurelia, Rhizostoma, Alcyonium, Corallium, Gorgonia, Pennatula, Madrepora, Metridium*

D Platyhelminthes &: *Dugesia, Fasciola, Taenia,* Aschelminthes *Schistosoma, Dracunculus, Ascaris* (male and female*),*

Wucheraria, Enterobius

E Annelida : *Nereis, Heteronereis, Aphrodite, Arenicola, Chaetopterus Pontobdella, Hirudinaria, Pheretima*.

F Onychophora : *Peripatus.*

G Arthropoda : *Palaemon, Limulus, Aranea, Palamnaeus, Lepas, Balanus , Apus, Sacculina, Eupagurus, Carcinus, Lepisma, Pediculus, Schistocerca, Bombyx, Xenopsylla, Apis, Cimex, Julus, Scolopendra, Ixodes, Sarcoptes, Cyclops.*

H Mollusca : *Mytilus, Chiton, Teredo, Turbinella, Laviculus, Patella, Limax, Helix, Doris, Aplysia, Dentalium, Nautilus, Sepia, Octopus, Loligo, Pecten, Solen, Pila, Pinctada.*

I Echinodermata : *Asterias, Pentaceros, Antedon, Ophiothrix, Holothuria.*

J Hemichordata : *Balanoglossus, Saccoglossus.*

II. Study of the permanent slides, sections passing through different regions of animals and developmental

stages.

1 Protozoa : Blood smears showing malarial parasite. *Paramecium*: Binary fission, conjugation.

2 Porifera : T.S. and L.S. of *Sycon*., spicules, spongin fibres and gemmules

3 Coelenterata : *Obelia* (colony and medusa), Planula, Scyphistoma and ephyra larva of *Aurelia,* T.S. of mesentry of *Metridium*

4 Platyhelminthes : Miracidium, sporocyst, redia and cercaria larvae of *Fasciola,* scolex of *Taenia,* W.M. of mature and gravid proglottids of *Taenia*, hexacanth and cysticercus larvae of *Taenia.*

5 Aschelminthes : T.S. of *Ascaris.*(male and female)

6 Annelida : T.S. of *Nereis* through different regions, parapodia of *Nereis* and *Heteronereis*. Trochophore larva.

7 Arthropoda : V.S. of compound eye, nauplius, zoea, megalopa larvae and *Mysis*

8 Mollusca : T.S. of gill lamella and T.S. of shell of *Lamellidens*, glochidium larva.

9 Echinodermata : T.S. of arm, tubefeet and pedicellaria, bipinnaria larva of starfish, echinopluteus larva.

10 Hemichordata : Torneria larva.

III Dissections:

1. *Pheretima* : General anatomy, digestive, nervous, excretory and reproductive systems.

2. *Palaemon* : Appendages, general anatomy, digestive system and nervous system.

3. *Periplaneta* : General anatomy, digestive system, nervous system and reproductive systems.

4. *Pila* : Organs of pallial complex, nervous system.

IV Mountings : Permanent preparation of the following:

1 Protozoa : *Euglena, Paramecium*, rectal ciliates, *Polystomella.*

2 Porifera : Sponge spicules, sponging fibres and gemmules.

3 Coelenterata : *Obelia* (colony and medusa)

4 Platyhelminthes : Proglottid of *Taenia*.

5 Annelida : Parapodia of *Nereis* and *Heteronereis*, ovary, septal nephridia and setae (*in situ*) of earthworm.

6 Arthropoda : Statocyst and hastate plate of prawn, salivary glands and tracheae of cockroach, W.M. of *Cyclops, Daphnia*, mouth parts of any 4 insects, *Culex,Anopheles* male and female, housefly, cockroach and honey bee.

7 Mollusca : Gill lamella, glochidium larva, osphradium and radula of *Pila.*

Cell Biology

1. Prepared slides of mitochondria, Golgi bodies, centrosome, different stages of mitosis.

2. Buccal smear preparation for localization of mitochondria and Golgi complex using vital stains.

3. Demonstration of chromosomes in the buds of *Tradescantia / Aloe vera* and in root tips of *Allium cepa.*

4. Squash preparation of polytene chromosomes.

Developmental Biology

1 W.M of eggs, early cleavage stage, T.S. of blastula and gastrula of frog.

2 Study of chick embryo. 18 hours, 24 hours, 36 hours, 48 hours and 72 hours.

3 T.S. of ovary and testis.

4 Sperm smear to study the structure of sperm.

5 Foetus with placenta.

REFERENCE BOOKS (LATEST EDITIONS) :

LIFE AND DIVERSITY OF ANIMALS (INVERTEBRATES)

1 Hickman C.P.Jr.,F.M. Hickman and L.S. Roberts, Integrated Principles of Zoology, Mosby College Publication. St. Louis.

2 Ayyar, E.K. and T.N.Ananthakrishnan, Manual of Zoology, Vol.1 (Invertebrata), Parts I and II. S, Viswanathan (Printers and Publishers) Pvt. Ltd.Madras.

3 Jordan, E.L. and P.S.Verma, Invertebrate Zoology, S.Chand & Co. Ltd., Ram Nagar, New Delhi. (English and Hindi Editions).

4 Parker, T.J. and Haswell, W.A.: Text Book of Zoology, Vol.1, (Invertebrata), A.Z.T.B.S. Publishers and Distri-butors, New Delhi- 110051

5 Ismail, S.A., Vermicology : The Biology of Earthworms, Orient Longman, India.

6 Kotpal, R.L.: Modern Text Book of Zoology : Invertebrates, Rastogi Publications, Meerut. (English and Hindi Editions)

7 Storer, T.I. and Usinger, K.L. : General Zoology, Tata McGraw- Hill Publishing Co., New Delhi.

8 Simpson, GG : Principles of Taxonomy, Oxford and IBH Publisher Co. New Delhi.

CELL AND DEVELOPMENTAL BIOLOGY :

9 Alberts B., Bray D., Lewis J., Raff M., Roberts K. and J.D. Watson, Molecular Biology of the Cell (Garland).

10 Balinsky, An Introduction to Embryology (CBS College Publishers)

11 Grant : Biology of Developing systems (Holt, Reihart and Winston).

12 Gilbert : Developmental Biology (Sinauer)

13 Lodish, H., et al., Molecular Cell Biology (Freeman).

PRACTICAL :

14 Verma, PS, A manual of practical Zoology S.Chand and Co. Ltd., Ram Nagar, New Delhi (English and Hindi Editions).

15 Lal, SS : Practical Zoology , Invertebrates, Rastogi Publication, Meerut (English and Hindi Editions).

FIRST YEAR B.Sc.B.Ed.INTEGRATED COURSE

BOTANY

Papers		No. of Papers	No. of Periods in a Week	Max. Passing Marks	Min. Passing Marks
Paper- I	Algae, Lichens and Bryophytes	1	3	50	18
Paper – II	Mycology, Microbiology and Plant Pathology	1	3	50	18
Paper – III	Palaeobotany, Pteridophytes & Gymnosperms	1	3	50	18
PRACTICALS		1	6	50	18

Duration of examination of each theory paper 3 hrs.

Duration of examination of practical 5 hrs. (in one day)

Paper Code : 9353

PAPER-I

ALGAE, LICHENS AND BRYOPHYTES

Unit-1

General characters, thallus organisation, pigments and reserve food material in algae. Electron microscopic structure of *Chalamydomonas* and the Cyanophycean cell. Fritsch's Classification and modern trends in classification. Morphology, reproduction and evolutionary relationships in the following: Cyanophyta : *Oscillatoria, Nostoc*. Chlorophyta : *Chlamydomonas, Volvox, Hydrodictyon* and *Cladophora*.

Unit-2

General characters of Xanthophyta, its relationship with Chlorophyta, Morphology and reproduction in Xanthophyta : *Vaucheria;* Chlorophyta : *Coleochaete* and *Oedogonium*; Charophyta : *Chara.* General account of Bacillariophyceae.

Unit-3

Morphology & reproduction in Phaeophyta: *Ectocarpus*; Rhodophyta: *Polysiphonia*. Economic importance of algae. Lichens: Important features, structure, habitat, importance as colonisers and indicators of environment. Vegetative multiplication and life cycle of *Parmelia* and *Usnea*.

Unit-4

General characters and classification of Bryophytes. The evolutionary trends in thallus structure and sporogonium. Morphology and life history of *Riccia, Marchantia, Pellia, Porella* and *Anthoceros*.

Unit-5

Morphology, life history and relationships of *Sphagnum* and *Polytrichum*. Economic importance of Bryophytes.

Note:

The paper setter is required to set questions of 3 types contained in 3 Sections (**Section A-** 10 questions,

Section B- 10 questions and **Section C**- 4 questions) from the 5 units of each paper. There will be 10 questions in **Section A** which will be asked from all the 5 units, i.e., 2 questions from each unit. These questions have to be answered in one word or a few words only. Each question will be of half mark . All the questions in **Section A** are compulsory. In **Section B,** 10 questions will be set from the 5 units, i.e., 2 questions from each unit. Students are required to attempt at least 1 question from each unit. Each question will carry 5 marks. The answers of each question should be given in about 250 words. In **Section C** there will be 4 descriptive type questions set from all the 5 units, not more than 1 question from each unit. These questions may also have subdivisions. The students are required to answer 2 questions, each in approximately 500 words. Each question will carry 10 marks.

In short, pattern of question paper and distribution of marks for UG classes will be as under :

Section A: 10 questions, 2 questions from each unit, short answer, all questions compulsory.

Total marks: **05**

Section B: 10 questions, 2 question from each unit, 5 question to be attempted, at least 1 from each unit, answer approximately in 250 words.

Total marks: **25**

Section C: 04 questions (question may have subdivision), not more than 1 question from each unit, descriptive type, answer in about 500 words, 2 questions to be attempted.

Total marks: **20**

Paper Code : 9354

PAPER-II

MYCOLOGY, MICROBIOLOGY AND PLANT PATHOLOGY

Unit-1

Characteristics and broad classification of fungi. Structure and life history of *Albugo, Penicillium, Phylla-ctinia* and *Morchella.* Elementary knowledge of Mycorrhizae and their symbiotic significance.

Unit-2

Structure and life history of *Puccinia, Ustilago, Agaricus* and *Alternaria*. Economic importance of fungi : food, industries, medicine and biological controls.

Unit-3

Characteristics, classification, structure and repro-duction of bacteria. Isolation and pure culture of bacteria, Gram's staining. Salient features of Micro-biology of water, soil and food.

Unit-4

Characteristics, structure and economic importance of Mycoplasma. Viruses: Nature, structure, trans-mission and multiplication of plant viruses.

Unit-5

Principles of plant pathology. Methods of disease control. Important symptoms of plant diseases of the following : Green ear disease of Bajra. Loose smut of Wheat, Black Rust of Wheat, Citrus canker. Little leaf of *Solanum melongena* (Brinjal). Yellow vein mosaic of Bhindi, Tikka disease of ground nut.

Note :

The paper setter is required to set questions of 3 types contained in 3 Sections (**Section A-** 10 questions, **Section B**- 10 questions and **Section C**- 4 questions) from the 5 units of each paper. There will be 10 questions in **Section A** which will be asked from all the 5 units, i.e., 2 questions from each unit. These questions have to be answered in one word or a few words only. Each question will be of half mark . All the questions in **Section A** are compulsory. In **Section B,** 10 questions will be set from the 5 units, i.e., 2 questions from each unit. Students are required to attempt at least 1 question from each unit. Each question will carry 5 marks . The answers of each question should be given in about 250 words. In **Section C** there will be 4 descriptive type questions set from all the 5 units, not more than 1 question from each unit. These questions may also have sub-divisions. The students are required to answer 2 questions, each in approximately 500 words. Each question will carry 10 marks .

In short, pattern of question paper and distribution of marks for UG classes will be as under :

Section A : 10 questions, 2 questions from each unit, short answer, all questions compulsory. Total marks **: 05**

Section B : 10 questions, 2 question from each unit, 5 question to be attempted, at least 1 from each unit, answer approximately in 250 words. Total marks : **25**

Section C: 04 questions (question may have sub-division), not more than 1 question from each unit, descriptive type, answer in about 500 words, 2 questions to be attempted. Total Marks : 20

Paper Code : 9355

PAPER-III

PALAEOBOTANY, PTERIDOPHYTES AND GYMNOSPERMS

Unit-1

Characteristics and broad classification of pterido-phyta. Stelar system in pteridophytes. Geological Time Scale. Types of fossils, process of fossilization. Applied aspects of Palaeobotany. Structure of *Rhynia* and *Williamsonia*.

Unit-2

Occurrence, structure and life history of *Psilotum, Lycopodium* and *Equisetum*.

Unit-3

Occurrence, structure and life history of *Selaginella* and *Marsilea*. Homospory, heterospory and origin of seed habit.

Unit-4

General characters, economic importance and broad classification of Gymnosperms, occurrence, structure of life history of *Cycas*.

Unit-5

Occurrence, structure and life history of *Pinus* and *Ephedra*.

Note :

The paper setter is required to set questions of 3 types contained in 3 Sections (**Section A-** 10 questions, **Section B**- 10 questions and **Section C**- 4 questions) from the 5 units of each paper. There will be 10 questions in **Section A** which will be asked from all the 5 units, i.e., 2 questions from each unit. These questions have to be answered in one word or a few words only. Each question will be of half mark . All the questions in **Section A** are compulsory. In **Section B,** 10 questions will be set from the 5 units, i.e., 2 questions from each unit. Students are required to attempt at least 1 question from each unit. Each question will carry 5 marks . The answers of each question should be given in about 250 words. In **Section C** there will be 4 descriptive type questions set from all the 5 units, not more than 1 question from each unit. These questions may also have sub-divisions. The students are required to answer 2 questions, each in approximately 500 words. Each question will carry 10 marks .

In short, pattern of question paper and distribution of marks for UG classes will be as under :

Section A : 10 questions, 2 questions from each unit, short answer, all questions compulsory. Total marks **: 05**

Section B : 10 questions, 2 question from each unit, 5 question to be attempted, at least 1 from each unit, answer approximately in 250 words. Total marks : **25**

Section C : 04 questions (question may have sub-division), not more than 1 question from each unit, descriptive type, answer in about 500 words, 2 questions to be attempted. Total marks : **20**

PRACTICALS

The practical exercises have been divided into following two groups based on the theory papers as detailed below:

Group-I Algae, Fungi, Lichens, Microbiology and Plant Pathology.

Group-II Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany.

GROUP I

Microscopic preparations and study of following algal materials: *Nostoc, Oscillatoria, Chlamydomonas, Volvox, Coleochaete, Hydrodictyon, Cladophora, Oedogonium, Vaucheria, Chara, Ectocarpus* and *Polysiphonia*.

Study of different types of Lichen specimens.

Microscopic preparation and study of following fungal materials : *Albugo, Phyllactinia, Morchella, Penicillium, Ustilago,Agaricus, Puccinia* and *Alternaria*.

Study of some locally available materials showing plant diseases caused by Viruses, Mycoplasma, Bacteria and Fungi in field/ laboratory. Yellow vein mosaic of Bhindi, Little leaf of *Solanum melongena* (Brinjal), Citrus canker, Green ear disease of bajra, Rust and Smut of wheat and White rust of crucifers.

GROUP II

Study of external and internal morphology and micro-scopic preparations of following Bryophytes : *Riccia, Marchantia, Plagiochasma, Pellia, Anthoceros, Sphagnum* and *Polytrichum.*

Microscopic examination of fossil slide specimens/ photographs: *Rhynia* and *Williamsonia*.

Temporary, double stained microscopic preparations and study of stem/ rhizome, anatomy of following pteri-dophytes: *Psilotum, Lycopodium, Selaginella, Equisetum* and *Marsilea*. Study of temporary, single stained micro-scopic preparation of the following : Cone of *Lyco-podium, Selaginella* and *Equisetum.* Petiole, Root and Sporocarp of *Marsilea* ; Rhizophore and root of *Selagi-nella.*

Temporary, double stained microscopic preparations of T.S., T.L.S. and R.L.S. of stem of *Pinus* and *Ephedra* and T.S. Leaflet and Rachis of *Cycas* and needle of Pinus, T.S. of normal and coralloid roots of *Cycas*. Microscopic preparations of male cone of *Pinus* and male and female cones of *Ephedra*. Study of male cone and megasporophyll of *Cycas*.

MARKING SCHEME

There shall be a practical examination of five hours duration and the distribution of marks shall be as follows :

S.No	TOPIC	MARKS
1.	A double stained section of plant part either of Pteridophyte or Gymnosperm glycerine mount	
2.	Minor preparation of Pteridophyte or Gymnosperm (not covered in Q.1)	
3.	Preparation and mounting of the part of : a) A Bryophyte b) A Fungus c) An Alga d) Bacteria	
4.	Spots : Seven a) (a) One from each group (Algae, Lichen, Bryophytes, Fungi, Fossil, Pteridophytes, Gymnosperms). b) One microbiological experiment for comments.	
5.	Viva-Voce	
6.	Practical records	
	TOTAL	

BOOKS SUGGESTED

Alexopoules, C.J.: Introductory Mycology, John Wiley and Sons, N.Y. 1978.

Bendre, A. and Kumar, A.: A Test Book of Practical Botany, Rastogi Publication, Meerut.

Ghemawat, M.S., Kapoor, J.N. and Narayan, H.A.: A Text Book of Algae, Ramesh Book Depot, Jaipur, 1976.

Gupta, M.N.: A Class Book of Gymnosperms, 1978.

Parihar, N.S.: An Introduction to Embryophyta, Vol. I, Pteridophyta, Vol.II, Central Book Depot, Allahabad, 1969.

Sharma, P.D.: Fungi, Rastogi Publications, Meerut, 1989.

Sharma, P.D.: Microbiology and Plant Pathology, Rastogi and Co. Meerut, 1989.

Vashishtha, B.R.: Botany for Degree Students (Algae, Fungi, Bryophyta and Gymnosperms), S. Chand and Co., New Delhi, 1976.

Singhvi, V., Pandey, P.C. and Jain, D.K.: A Text Book of Botany, Rastogi and Co., Meerut.

FIRST YEAR B.Sc.B.Ed. INTEGRATED COURSE

MATHEMATICS

(Common for the Faculties of Arts & Science)

Papers	Teaching hours/ week	Examination Hours	Maximum Marks
			B.Sc
Paper – I	3	3	50
Paper – II	3	3	75
Paper –III	3	3	75
Total Marks			200

Note :

1. Common papers will be set for both the Faculties of Arts & Science.
2. Students are allowed to use simple electronic desk calculators (as per University guidelines).
3. Mathematical/ Log Tables may be used (as per University guidelines).

Paper Code : 9357

PAPER-I

ALGEBRA

Note : The question paper will be divided into three sections A, B and C as follows:

Section A : In this section, ten questions will be set taking two questions from each unit. Each question will be of short answer type not exceeding 20 words and will carry 3/4 mark. The candidate will be required to attempt all the questions (aggregating 7.5 marks).

Section B : In this section, ten questions will be set taking two questions from each unit. The answer of each will not exceed 250 words or two and a half page. Each question will be of 7.5 marks. The candidate will be required to attempt five questions in all taking one question from each unit (aggregating 37.5 marks).

Section C : In this section, four questions will be set covering all the five units and whose answers shall not exceed 500 words or five pages each. Each question may have sub parts in it and will carry 15 marks. The candidate will be required to attempt any two questions (aggregating 30 marks).

UNIT-I

Symmetric, Skew Symmetric, Hermition and skew Hermition matrices. Linear independence of row and column matrices. Row rank, column rank. and rank of a matrix. Equivalence of column and row ranks. Eigen values, Eigen vectors and characteristic equation of a matrix. Cayley-Hamilton theorem and its use in finding inverse of a matrix. Theorems and examples of consistency of a system of linear equations.

UNIT-II

Groups and their defining theorems. Various examples, order of an element and related theorems, Permutation Groups, even and odd permutations, cyclic groups, subgroups, union, intersection of two and finite subgroups and various examples, product of two subgroups. Left and right cosets and their properties, Lagrange's theorem, index of a subgroup.

UNIT-III

Group homomorphism and isomorphism with elementary basic properties, Cayley's theorem for finite groups, normal subgroups their examples and elementary basic theorems, Quotient group, fundamental theorem of homomorphism in groups.

UNIT-IV

Rings, definition and examples of various kinds of rings, integral domain, division ring, field, characteristic of a ring and of integral domain, subring and subfield with examples. Left and right ideals with examples and properties, Principal ideal, principal ideal ring.

UNIT-V

Quotient ring, homomorphism and isomorphism in rings, kernel of homomorphism, Fundamental theorem of ring homomorphism. Relation between the roots and coefficients of general polynomial equation in one variable. Transformation of equations. Descarte's Rule of signs, solution of Cubic equations (Cardon method). Biquadratic equations.

References :

1. I.N. Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
2. R.S. Agrawal : A Textbook on Modern Algebra.
3. K.B.Datta : Matrix and Linear Algebra Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
4. H.S.Hall and : Higher Algebra, H.M. Publica- S.R. Knight tions, 1994.
5. Bansal, : Amurt Big Ganita. Bhargava, Agrawal
6. Chandrika: Text book on Algebra and Theory Prasad of Equations, Pothi shala Pvt. Ltd, Allahabad.
7. Gokhroo, Saini : Elements of Abstract Algebra
8. Sharma, Purohit : Elements of Abstract Algebra

Paper Code : 9358

PAPER-II

CALCULUS

Note : The question paper will be divided into three sections A, B and. C as follows:

Section A : In this section, ten questions will be set taking two questions from each unit. Each question will be of short answer type not exceeding 20 words and will carry 3/4 mark. The candidate will be required to attempt all the questions (aggregating 7.5 marks).

Section B : In this section, ten questions will be set taking two questions from each unit. The answer of each will not exceed 250 words or two and a half page. Each question will be of 7.5 marks. The candidate will be required to I attempt five questions in all taking one question from each unit (aggregating 37.5 marks).

Section C : In this section, four questions will be set covering all the five units and whose answers shall not exceed 500 words or five pages each. Each question may have sub parts in it and will carry 15 marks. The candidate will be required to attempt any two questions (aggregating 30 marks).

UNIT-I

Polar coordinates and derivatives of arc, Polar subtangent and subnormal, pedal-equation, successive differentiation. Leibnitz theorem. Maclaurin and Tailor series expansions.

UNIT - II

Asymptotes, curvature, Test of concavity and convexity. Points of inflexion. Multiple points. Tracing of curves in Cartesian and polar coordinates.

UNIT - III

Reduction formula for nth power of trigonometric functions. Quadrature, Rectification, volumes and surfaces of solid of revolution.

UNIT - IV

Degree and order of a differential equation. Equations of first order and first degree, Equations in which the variables are separable, Homogeneous equations. Linear equations and equations reducible to the linear form. Exact differential equations.

UNIT - V

First order and higher degree equations solvable for x,y, p. Clairaut's form and singular solutions. Geometrical meaning of a differential equation. Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations and the equations reducible in homogeneous form.

References

1. Gorakh Prasad : A Text book on differential calculus (Pothi shala)

2 Gorakh Prasad : A Text book on Integral calculus and Differential Equations (Pothi shala).

3. E.A.Codignton : An introduction to ordinary Differential Equations Prentice Hall of India, 1961.

4. P.K. Jain and : An Introduction to Real S.K.Kaushik Analysis, S.Chand & Co., New Delhi-II 2000.

5. Bansal, : Avakalan Ganita-II Bhargava

6. Bansal, : Samakalan Ganita-Il Bhargava

7. Gokhroo, Saini : Uchch Avakalan Ganita

8. Gokhroo, Saini : Uchch Samakalan Ganita.

9. Bansal, Bhargava : Avkal Samikaran I. & Agrawal

10. Gokhroo, Saini, : Avkal Samikaran. Kumbhat

Paper Code : 9359

PAPER-III

GEOMETRY

Note : The question paper will be divided into three sections A, B and C as follows:

***Section* A** : In this section- ten questions will be set taking two questions from each unit. Each question will be of short answer type not exceeding 20 words and will carry 3/4mark. The candidate will be required to attempt all the questions (aggregating 7.5 marks).

***Section* B** : In this section- ten questions will be set taking two questions from each unit. The answer of each will not exceed 250 words or two and a half page. Each question will be of 7.5 marks. The candidate will be required to attempt five questions in all taking one question from each unit (aggregating 37.5 marks).

Section C : *In* this section four questions will be set covering all the five units and whose answers shall not exceed 500 words or five pages each. Each question may have sub parts in it and will carry 15 marks. The candidate will be required to attempt any two questions (aggregating 30 marks).

UNIT -I

General equation of second degree, nature of conic, eccentricity and foci of conic, Tracing of different conics.

Ellipse : Tangent, normal, Chord of contact of the tangents, pole and polar, eccentric angle, auxiliary circle, director circle, equation of chord in term of middle point, pair of tangents, conjugate lines, diameter and conjugate diameters and their properties.

UNIT-II

Hyperbola: Parametric coordinates, tangent, normal chord of contact of tangents, pole and polar etc. asymptotes, conjugate hyperbola, conjugate diameters, rectangular hyperbola, equation of hyperbola referred to its asymptotes.

Polar Equations :Polar equation of a conic, Polar equations of tangent, perpendicular lines and normal, director circle of the conic.

UNIT-III

Plane: Revision of Equations of plane in different forms, bisectors of angles between two planes, condition for homogeneous, equation to represent two planes and angle between them, projection on a plane area of a triangle and volume of tetrahedron.

UNIT-IV

Straight line : General equation of line, symmetric

form, line passing through one and two points, perpendicular distance of a point from a line, angle between a line and a plane, condition for co-planarity of two lines, equations of line intersecting two lines, skew lines, shortest distance between two lines, intersection of three planes and three lines.

UNIT-V

Sphere, Cone, Cylinder.

References :

1. Gorakh Prasad & : A Text book of coordinate(H.C.Gupta Geometry (Pothishala)

2. S.L.Loney : The Elements of coordinate Geometry; Mack-Millan and Company, London

3. R.J.T. Bell : Elementary Treatise on coordinate Geometry of the Dimensions

4. P.K. Jain and : A Textbook of Analytical Khalil Ahmed Geometry of three Dimensions, Wiley Eastern Ltd., 1999.

5. N.Saran and : Analytical Geometry of three R.S.Gupta Dimentions. (Pothhishala)

6. Bansal, Bhargava :Dwivim Nirdeshank Jysrruyl

7. Gokhroo, Saini : Dwivirn Nirdeshank Jyamiti

8. Gokhroo Saini, : Trivim Nirdeshank Jyamiti

9. Bansal, Bhargava : Trivim Nirdeshank Jyamiti.

10. Golas, Tandon, : Analytical solid Geometry. Bhargava