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.)

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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/COMPUTER SCIENCE

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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**		**Max. Marks**	**Min. Marks**
Course 1	9371	Childhood and Growing up		100 (80+20)	36
Course 2	9372	Contemporary India and Education (Including Gender, School & Society)		100 (80+20)	36
Course 3	9373	Understanding the Self (Internal Assessment)		50	20
Course 4	9374	School Observation		50	20
Course 5	9601	Core Subjects*			
		a) Gen English.		100	36
	9602	b) Environmental Studies		100	36
				25	9
Course 6	9341	Physics I		50	18
	9342	Physics II		50	18
	9343	Physics III		50	18
	9344	Physics Practical		75	27
Course 7 A	9345	Chemistry I		50	18
	9346	Chemistry II		50	18
	9347	Chemistry III		50	18
	9348	Chemistry Practical		75	27
Course 7 B	9360	Computer Science I		50	18
	9361	Computer Science II		50	18
	9362	Computer Science III		50	18
	9363	Computer Science Practical		75	27
Course 8	9349	Zoology I		50	18
	9350	Zoology II		50	18
	9351	Zoology III		50	18
	9352	Zoology Practical		75	27
Course 9	9353	Botany I		50	18
	9354	Botany II		50	18
	9355	Botany III		50	18
	9356	Botany Practical		75	27
Course 10	9357	Mathematics I		75	27
	9358	Mathematics II		75	27
	9359	Mathematics III		75	27

B.Sc.B.Ed FOUR YEARS INTEGRATED COURSE II Year					
Course No.	**Paper Code**	**Nomenclature**		**Max. Marks**	**Min. Marks**
Course 11	**9471**	**Learning & Teaching**		**100 (80+20)**	**36**
Course 12	**9491-9496**	**Pedagogy of School Subject I**		**100 (80 +20)**	**36**
Course 13	**9491-9496**	**Pedagogy of School Subject II**		**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**			
	9496	**6.Pedagogy of Computer Science**			
Course 14	**9484**	**Pre-Practice Teaching (Internal Assessment)**		**50 (40+10)**	**20**
		a) Practicing teaching Skill		**40**	
		b) T.L.M. Workshop in each Subject		**10**	
Course 15	**9485**	**Open Air Session / SUPW Camp (Internal Assessment)**		**50**	**20**
Course 16	**9603**	**Core Subject***			
		Critical Understanding of ICT		**50**	**18**
	9604	**Practical**		**50**	**18**
Course 17	**9441**	**Physics I**		**50**	**18**
	9442	**Physics II**		**50**	**18**
	9443	**Physics III**		**50**	**18**
	9444	**Physics Practical**		**75**	**27**
Course 18 A	**9445**	**Chemistry I**		**50**	**18**
	9446	**Chemistry II**		**50**	**18**
	9447	**Chemistry III**		**50**	**18**
	9448	**Chemistry Practical**		**75**	**27**
Course 18 B	**9460**	**Computer Science I**		**50**	**18**
	9461	**Computer Science II**		**50**	**18**
	9462	**Computer Science III**		**50**	**18**
	9463	**Computer Science Practical**		**75**	**27**
Course 19	**9449**	**Zoology I**		**50**	**18**
	9450	**Zoology II**		**50**	**18**
	9451	**Zoology III**		**50**	**18**
	9452	**Zoology Practical**		**75**	**27**
Course 20	**9453**	**Botany I**		**50**	**18**
	9454	**Botany II**		**50**	**18**
	9455	**Botany III**		**50**	**18**
	9456	**Botany Practical**		**75**	**27**
Course 21	**9457**	**Mathematics I**		**75**	**27**
	9458	**Mathematics II**		**75**	**27**
	9459	**Mathematics 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		100 (80+20)	36
Course 23	9572	Language acroos the curriculam (Including Reading & Reflecting on texts)		100 (80+20)	36
Course 24	9573	*a) Simulated teaching.* b)School Internship (Phase I,4 weeks) Internal assessment Engagement with the field: Tasks and Assignment for courses12 &13		50 100 = 150	60
Course 25	9575	External Assessment one lesson of Pedagogy of a School subject.		100	40
Course 26	9605	Core Subject*			
		General Hindi		100	36
ourse 28 A	9541	Physics I		50	18
	9542	Physics II		50	18
	9543	Physics III		50	18
	9544	Physics Practical		75	27
C	9545	Chemistry I		50	18
	9546	Chemistry II		50	18
	9547	Chemistry III		50	18
	9548	Chemistry Practical		75	27
Course 28 B	9560	Computer Science I		50	18
	9561	Computer Science II		50	18
	9562	Computer Science III		50	18
	9563	Computer Science Practical		75	27
Course 29	9549	Zoology I		50	18
	9550	Zoology II		50	18
	9551	Zoology III		50	18
	9552	Zoology Practical		75	27
Course 30	9553	Botany I		50	18
	9554	Botany II		50	18
	9555	Botany III		50	18
	9556	Botany Practical		75	27

	9557	**Mathematics I**	**I**	**75**	**27**
	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).

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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.

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Anglicist controversy, 1781-1843. Psychology Press.

PAPER CODE-9373

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**

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PAPER CODE-9601

FIRST YEAR

GENERAL ENGLISH

MM: 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.
* 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

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:

3. Waves and Oscillations, Berkley Physics Course Vol. III

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

PAPER CODE-9345

FIRST YEAR B.Sc CHEMISTRY 2016-17
Effective from session 2016-2017

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 I : INORGANIC CHEMISTRY

Time : 3 Hrs. **M.M. 50**

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, homonuclear and heteronuclear (CO, NO, HF and HCl) diatomic molecules, multi center 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, salvation energy and solubility of ionic solids, polarizing power and polarizing 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, solvation and complexation tendencies including their function in bio-systems, 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, hydroxide, 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, po]ymorphism, hydrides, 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, Lax - 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. Pun 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 Publication.

PAPER CODE-9346

PAPER II : ORGANIC CHEMISTRY

Time : 3 Hrs. **M.M. 50**

UNIT I

Structure and Bonding : Localized and delocalized chemical bond, Van der Waals interaction, charge transfer complexes, resonance, hyperconjugation, aromaticity electrometric, 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 equatorial 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, poIymerization, 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 s and p 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 : Nomenclature and classes of alkyl halides, methods of formation, chemical reactions, mechanism of nucleophilic substitution reactions of alkyl halides, S_N^2 and S_N^1 reactions with energy profile diagrams, factors affecting S_N^2 and S_N^1 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 reactivates 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 and 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 and III), S.M. Mukherji, S.P. Singh and R.P. Kapoor, Wiley Eastern Ltd., (New Age International).
7. Organic Chemistry, Morrison and Boyd, Prentice Hall.
8. Organic Chemistry (Hindi Ed.) : Suresh Ameta, P.B. Punjabi and B.K. Sharma, Himanshu Pub.

PAPER III : PHYSICAL CHEMISTRY

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, Bravias 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, KC1 and CsC1 (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 - Schuize 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 displacement law, radioactive series, separation and identification of isotopes, application of radioactivity and radioactive tracers.

UNIT V

Atomic Structure : Dual nature of electron, De Brogue equation, Davission and Germer experiment. Heisenberg uncertainty principle, Schrodinger wave equation, significance of y and y^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, Troution'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 and J. Vardia, Himanshu Pub.
5. Computers and Applications to Chemistry, Ramesh Kumari, Narosa Publishing House Pvt. Ltd.

PAPER CODE-9348

FIRST YEAR CHEMISTRY PRACTICALS 2016-17

Time : 5 Hrs (One day) **M.M. 50**

Distribution of Marks

	Exercises	Marks
1.	Semi-micro analysis of Inorganic mixture containing five radicals (excluding Na^+ and K^+)	10
2.	(i) Detection of extra element (N, S and halogen) if any and functional groups in given sample organic compounds.	7
	(ii) Purification of the given organic compounds by crystallization (charcoal) sublimation and determination of its m.p. OR Determination of mixed melting points using urea-cinnamic acid mixtures of given compositions.	7
3.	One Physical Chemistry Experiment	10
4	Vice-voce	8
5.	Records	8
	Total	50 marks

LIST OF EXPERIMENTS

1. **Semi-micro Analysis of Inorganic mixture**: The mixture shall contain **Five** radicals at least two cations and two anions) soluble in water or in HCl. Two cations of the same group except IIA and IIB 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) ,one organic compound from the following functional groups be given for identification:

   Carboxylic acids, Phenols, Alcohols, Carbohydrates, Aldehydes, Ketones, Nitro.

   Compounds : Amino compounds, Anilides Amides, Esters, Thiomide,

   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

Decolourization and crystallization using charcol : Crystallization and decolourization of impure naphtha lene (100 g of naphthalene mixed with 0.3 of Congo Red using 1 g decolourizing carbon) from ethanol.

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

Criteria of purity: Determination of M.P., B.P., Mixed M.P.

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

Ionic equilibria

a) Measurement of pH of different solutions like aerated drinks, fruit juices, shampoos and soaps (use dilute solutions of soaps and shampoos to prevent damage to the glass electrode) using pH-meter.

b) Preparation of buffer solutions and measurement of the pH of buffer solutions and comparison of the values with theoretical values of following buffers.

(i) Sodium acetate-acetic acid

(ii) Ammonium chloride-ammonium hydroxide

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 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 DH of the dissolution process.

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

Virtual experiments (any two)

(i) Purification of organic / inorganic compounds by crystallization / sublimation.

(ii) Preparation of biodiesel from vegetable oil.

(iii) Fractional distillation of crude oil / coal .

(iv) Conformational analysis of alkanes/ cycloalkanes.

(v) Any other virtual experiment related to the content of syllabus and availability of the experimental facilities.

BOOKS RECOMMENDED

1. Practical Chemistry - Giri, Bajpai and Pandey, S. Chand & Co. Ltd., New Delhi.
2. Laboratory Manual in Organic Chemistry, R.K. Bansal, Willey Eastern.
3. Experimental Organic Chemistry, Vol. I and II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.
4. Experiments in Physical Chemistry - J.C. Ghose, Bharti Bhawan.
5. Experiments in General Chemistry, N.r. Rado and U.C. Agarwal, Eastern Press.
6. Practical Chemistry - Suresh Ameta and P.b. Punjabi, Himanshu Publication.

FOUR YEAR INTEGRATED COURSE (B. Sc B.Ed.)2018-2021

COMPUTER SCIENCE

Each theory question 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 one or few 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 candidates have to answer any two questions of ten marks each. The answer may be given in approximately 500 words.

FIRST YEAR B.SC. B.Ed COMPUTER SCIENCE

Paper-I : Introduction to Information Technology

Paper Code - 9360

UNIT- I

Computer Basics :Introduction , Evolution of Computers, Generations of Computers ,Classification of Computers. The Computer system : Components of a Computer system ,Communication among various Units. Applications of computers.

UNIT- II

Computer Memory: Memory Hierarchy, Different Types of RAM& ROM.

System software: Introduction to system software, Distinction between systems software and Application software. Introductory ideas of loaders and linkersComputer language, Assemblers, Compilers and Interpreters.

UNIT- III

Operating systems : Evolution, introduction to OS , functions and facilities, single tasking and multitasking OS , single user and multi-user OS, characteristics of MS-DOS and Unix operating systems , DOS and UNIX commands for file and process management.

UNIT- IV

Text editors: overview of editing process

Graphical User Interfaces: Introduction to Windows, Word processing software packages and features, spread sheet packages and features,Working with Presentation packages.

UNIT- V

Computer Communications**:** Computer to computer communication through networking, Introduction to computer networks and networking software, Types of Networks, Internet and Intranet , Electronic mail. World Wide Web, URL ,Web browsers ,Search engine , Multimedia and Virtual reality.E-Commerce , Global Positioning System. Specifications of a typical desktop computer system, Recent Developments in ICT

Recommended books:

1. **Satish Jain : Information Technology**
2. **Alexis Leon : Fundamentals Of Information Technology**
3. **V.Rajaraman : Fundamentals of Computers**

Paper-II : Problem Solving Through C Programming

Paper Code - 9361

UNIT - I

Algorithm development:Definition and properties of algorithms, flow charts symbols, Types of flow chart, testing and debugging, Example of simple algorithms and flow chart. Program Development Cycle, Program design, Errors : syntax error , runtime error, logical error.

UNIT – II

Programming in C: structure of C programs, compilation and execution of C programs, character set, keywords, data types , constants, symbolic constants and variables, expressions.

Operators : Assignment , Arithmetic , Relational , Logical, Conditional , comma , Increment/ Decrement, Bitwise, sizeof operator , Compound assignment operators. Associativity and precedence of C operators. Input/ output statements.Control statements - if-else, switch.

UNIT – III

Loops - for, while, do-while.Nested loops and combined loops.

Break and Continue statements.

C preprocessor : Symbolic constants, macro substitution - Simple, Augmented , Nested.

UNIT – IV

Functions: built-in and user-defined functions, function declaration, Advantages of user-defined functions.Category of functions. parameter passing- call by value & call by reference, recursive functions.

Array:Creating of one dimensional array, initialization , Accessing elements of 1 D array. Two dimensional array,initialization , Accessing elements of 2D array.

Array and strings, string-handling functions.

UNIT – V

Pointers: pointer variable and its importance, pointer arithmetic, array of pointers, function of pointers, structure of pointers, dynamic memory allocation functions.

Structures and Union :Declaration of structures, initialization and accessing structure members. Function and structures , Array of structure, self-referential structure, unions, enumeration.

File Input/Output – Create, Open, Read, Write, Delete, Close.

Recommended books :

1. **Programming with C :- Schaum's outline Series**
2. **Programming with C :- E. Balagurusamy**

Paper-III : Digital Electronics

UNIT – I

Paper Code - 9362

Positional Number System : . Binary, decimal, octal and Hexadecimal number system. conversion from one base to another base. Representation of positive and negative integers, Real numbers,Characters.

Digital codes : weighted binary code, Non weighted code, Gray code. Binary to Gray conversion, Gray to binary conversion. BCD code. Binary Arithmetic in 1's and 2's complement.

UNIT -II

Boolean Algebra : Binary valued quantities, Logical Operations, Basic postulates of Boolean Algebra, Principle of Duality , Basic theorems of Boolean algebra , De- Morgan's Theorem. Finding complements of Boolean expressions. Minterm and Maxterm of Boolean Function.

Simplifications of SOP Boolean expressions using karnaugh map - 3 variables Boolean function, 4 variables Boolean Function.

UNIT - III

Basic Logic Gate, Universal Logic gate , Exclusive -OR, Equvalence OR gates.

Combinational Circuits : Half Adder , Full Adder, Parallel Binary Adder, Subtractor, Comparator , Decoder , Encoder , Multiplexer , Demultiplexer.

UNIT - IV

Combinational versus Synchronous circuits.

Flip Flop : Edge Triggered verus Pulse Triggered Flip Flop, S-R , D , J-K , T edge triggered Flip flop. J-K Master slave Flip flop

UNIT - V

Shift Register: Shift Register Function , Serial and Parallel Shift registers , Bi-directional Shift registers.

Counters : Asynchronous and Synchronous counters, Up/Down Counters, Decade Counters.

Recommended Books :

1. **Digital Fundamentals :-Thomas L. Floyd**
2. **Digital Logic and Computer Design :- Mano M.M.**

PAPER - IV : PRACTICALS

Paper Code - 9363

NOTE : Students are required to perform all the experiments selecting one from each part.

MARKS DISTRIBUTION

PART - A : 20
PART - B : 20
PART -C (POWERPOINT REPRESNTATION) : 10
VIVA : 10

Two RECORDS (Topic covered Part-A & part-B) : 15

PART - A

1. Programs based on C operators - Arithmetic , Relational , Conditional , sizeof , Logical , Bitwise, Increment /Decrement Operators
2. Programs based on to calculate the lvalue of the given Formulas. For Exp.
   - Compute area and circumference of a circle.
   - Compute surface area and volume of a sphere.
   - Compute sum of digit of 4 digit numbers.
   - Compute simple and compound interest.
   - Compute find distance between two points.
3. Programs based on Conversion formula. For exp.
   - Fahrenheit to Celsius conversion.
   - Convert seconds to hours, minutes and seconds.
   - Convert centimetre to meter , inches.
4. Program based on selective structure.
   - Using simple if .. else statements
   - Using Nested if .. else statements.
   - Using else .. if ladder.
   - Using Switch statements.
5. Program based on Repetitive structure.
   - Using while Loop.
   - Using do .. while loop.
   - Using for loop.
   - Using combined loop.
   - Using nested loops
6. Programs using break and continue statements within loop.
7. Programs Using 1D Array. For Exp.
   - Program create read and write 1D Array.
   - Linear search in 1D Array.
   - Find largest and Smallest from 1D Array.
   - Sorting the 1D Array.
8. Programs Using 2D Array. For Exp.
   - Program to create read and print m* n matrix.
   - Program add ,subtract & multiply two matrices.
   - Program to add row and column total.
   - To change diagonal of square matrix.
9. Programs using string handling function.
10. Programs using functions.
    - Using function and array.
    - Using recursive function.
    - Using call by value and call by reference.
    - Using function with arguments no return values.

Using function with arguments with return values.

11. Program using Pointers.
    - Using pointer arithmetic.
    - Using pointer and 1D array.
    - Using pointer and functions.
12. Programs using structure.

Create and print the structure of book, football team, date etc.

Program using structure and function.

Program using array of structure.

13. Program using C preprocessor.
14. Program based on files.
    - Using File management commands.
    - To display contents of a file.

To copy contents of a file from one to another

PART - B

1. Logic circuit and the function of basic logic gates and verify their truth tables.
2. Logic circuit and the function of universal gates.
3. Logic circuit and the fuction of XOR and XNOR gates.
4. To study the different logical expressions and their simplification.
5. To familiarize and verify the Boolean algebraic functions.
6. Conversion of positional number system from one base to another base.
7. Binary to gray and gray to binary code conversion.
8. Karnaugh map simplifications related Boolean functions.
9. Finding the Maxterm of Boolean function.
10. Finding the Minterm of Boolean function.
11. conversion of maxterm to minterm and vice versa.
12. Logic circuit and working of half adder.
13. Logic circuit and working of Full adder.
14. Logic circuit and working of parallel binary adder.
15. Logic circuit and working of Decoder circuits.(BCD to Decimal)
16. Logic circuit and working of encoder circuits.(Decimal to BCD)
17. Logic circuit and working of multiplexer.(4 X1) (8 X 1)
18. Logic circuit and working of demultiplexer (1 X 4) (1 x8)
19. Logic circuit and working of Edge Triggered Flip flops circuits.
    S-R , D , J-K , T
20. Logic circuit and working of Master Slave Flip Flop circuits.
21. Logic circuit and working of Shift registers.
    serial , parallel and Bi directional.
22. Logic circuit and working of Counters.
    Asynchronous , Synchronous and Up/down , Decade Counters.

PART - C

Power point presentation on the topics covered in Paper -I , Paper - II ,Paper -III as assigned by the concerned teacher.

FIRST YEAR T. D.C. SCIENCE, 2018-19

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 are 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 T. D.C.SCIENCE, 2018-19

ZOOLOGY

PAPER-I: LIFE AND DIVERSITY OF ANIMALS-I (INVERTEBRATES)

Duration : 3 hours **M.M. 50**

UNIT- I

1 General characters and classification of Protozoa and Porifera (up to classes) with examples.

2 Type study: Paramecium. Parasitic protozoans and their Pathogenesis

3 Type study-Sycon.

4 Canal system in sponges.

UNIT-II

5 General characters and classification of Coelenterata and Ctenophora

6 Type study-Obelia.

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

8 Affinities of Ctenophora

UNIT-III

9 General characters and classification of Platyhelminthes (upto classes) and Aschelminthes (upto phyla)

10 Type study –Fasciola , Taenia

11 Concept of pseudocoelom

12 General characters and classification of Nematoda (upto classes)

13 Type study: Ascaris

14 Endoparasites in relation to human diseases, parasitic adaptations of trematodes, cestodes, and nematodes.

UNIT-IV

15 General characters and classification of Annelida and Arthropoda (up to classes) with examples.

16 Concept of metamerism, segmentation and coelom

17 Type study-Pheretima, Periplaneta.

18 Economic importance of arthopods

UNIT-V

19 General characters and classification of and Mollusca and Echinidermata (up to classes) with examples.

20 Type Study –Pila *and* Asterias

21 Concept of Torsion and its importance

22 Echinoderm larvae.

PAPER CODE-9350

FIRST YEAR T.D.C.SCIENCE, 2018-19

ZOOLOGY

PAPER II : CELL BIOLOGY

Duration : 3 hours **M.M. 50**

UNIT -I

1 Cell theory and its modern interpretation

2 Structure, function and general characteristics various types of cells

3 Prokaryotic and eukaryotic cells.

UNIT -II

4 Various models and hypothesis in understanding the structure of plasma membrane (Overton, Danielli and Davisson, Robertsons and Fluid mosaic model)

5 Functions of plasma membrane and membrane transport

6 Cell cytoskeleton-Microtubule, Microfilament and Intermediate Filament.

7 Structure and function Cilia, flagella, Centriole and basal bodies.

8 Brief idea of cell cycle (General description of mitosis and meiosis).

UNIT -III

9 Structure and function of nucleus and nucleolus.

10 Nucleic acids: Watson and Crick model of DNA, chemical nature of DNA and replication of DNA.

11 Chemical nature and structure of various types of RNAs and basic concept of transcription

UNIT -IV

12 Structure and function of Ribosome

13 Structure and function of Endoplasmic Reticulum (Rough and Smooth)

14 Basic concept of Protein Synthesis.

UNIT -V

15 Structure and function of Golgi. Concept of GERL system.

16 Structure and function of Mitochondria and Peroxisomes.

17 Structure, function and polymorphism of Lysosomes.

PAPER CODE-9351

FIRST YEAR T.D.C. SCIENCE, 2018-19

ZOOLOGY

PAPER- III : DEVELOPMENTAL BIOLOGY

Duration : 3 hours **M.M. 50**

UNIT -I

1 Aims and scope of developmental biology. Brief historical review and concepts of Embryology.

2 Neuroendocrine regulation of reproductive organs in brief.

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

UNIT -II

4 Fertilization: Main events of fertilization, acrosome reaction, polyspermy preventing mechanisms.

5 Errors in fertilization and significance of fertilization. Parthenogenesis (In brief)

6 *In vitro* fertilization and test tube baby.

7 Embryo transplant.

UNIT -III

8 Cleavage: planes, patterns & types of cleavage.

9 Blastulation: Types of blastulae.

10 Gastrulation: fate maps, morphogenetic movements and their significance in gastrulation. Mechanism and main characteristic of gastrulation.

UNIT -IV

11 Elementary knowledge of fate of three germ layers.

12 Primary organizer and embryonic induction, concept of competence.

13 Determination, differentiation; Main characteristics of growth and regeneration.

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 T.D.C. SCIENCE – 2018-19

ZOOLOGY: PRACTICAL

Duration : 5 hours **M.M. 50**

S.No.	Exercise	
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**

Major Dissection marks will be given only if virtual dissection is available otherwise marks may be given according to availability of dissection alternate.

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, Trypanosoma, Nyctotherus, Paramecium, Vorticella*,
B	Porifera	:	*Scypha, Hyalonema, Euplectella, Spongilla, Euspongia.*
C.	Coelenterata	:	*Physalia, Aurelia, Alcyonium, Corallium, Gorgonia, Pennatula, Madrepora, Metridium*
D	Platyhelminthes and Aschelminthes	:	*Dugesia, Fasciola, Taenia, Schistosoma, Dracunculus, Ascaris* (male and female*), Wucheraria, Enterobius*
E	Annelida and	:	*Nereis Heteronereis, Aphrodite, Arenicola, Chaetopterus Hirudinaria*.
F	Onychophora	:	*Peripatus.*
G	Arthropoda	:	*Limulus, Aranea, Palamnaeus, Lepas, Balanus, Apus, Sacculina, Eupagurus, Carcinus, Lepisma, Pediculus, Bombyx, Apis, Cimex, Julus, Scolopendra, Ixodes.*
H	Mollusca	:	*Mytilus, Chiton, Teredo, Turbinella, Laviculus, Limax, Doris, Aplysia, Dentalium, Nautilus, Sepia, Octopus, Loligo, Pecten, Solen, 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 larvae 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: Various systems of preserved animals/Virtual dissection

Virtual dissection of Digestive, Blood Vascular, Excretary, Reproductive system of Frog Rat/Rabit (if facility of virtual is made available by University)

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

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

3 *Cockroach* : Mouth parts, Alimentary canal and Reproductive system (only after permission from institutional animal ethical committee otherwise virtual)

IV Mountings: Permanent preparation of the following:

1	Protozoa	:	*Euglena, Paramecium*, rectal ciliates, *Polystomella.*
2	Porifera	:	Sponge spicules, spongin 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. Preparation of Mitosis.
4. Squash preparation of polytene chromosomes.

Developmental Biology: Slides and specimen

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.

- The teacher concerned will provide e-materials to practical in the form of video or demonstrations or written materials including dissections.

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) Pct. 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 and Haswell, Text Book of Zoology, Vol.1, (Invertebrata), A.Z.T.B.S. Publishers and Distributors, New Delhi- 110051

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

6 Kotpal, RL. Agarwal and Khetrapal: 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, Bray, Lewis, Raff, Roberts and 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 Alberts, B., et al., Molecular Biology of the Cell (Garland)

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

PRACTICAL :

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

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

PAPER CODE-9353

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

BOTANY

Papers		No. of	No. of Periods	Max. Passing	Min. Passing

		Papers	in a Week	Marks	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-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, Phyllactinia* 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**

PAPER CODE-9356

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.

PAPER CODE-9357

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

FIRST YEAR B. Sc. MATHEMATICS 2016-17

PAPER-I

ALGEBRA

Duration: 3 Hours **Max. Marks: 50**

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

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. Horner's Method, Ferrari's Method.

UNIT-III

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.

UNIT –IV

Left and right cosets and their properties, Lagrange's theorem, index of a subgroup. Normal subgroups their examples and elementary basic theorems, Quotient group. Simple group, centre of group, Normalizer of an element and that of a subgroup, Conjugacy relation, class equation for finite groups.

UNIT-V

Group homomorphism and isomorphism with elementary basic properties, Cayley's theorem for finite groups, fundamental theorem of homomorphism in groups. The three isomorphism theorems of groups. Automorphisms and inner automorphisms.

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 S.R. Knight : Higher Algebra, H.M. Publications, 1994.
5. Bansal, Bhargava, Agrawal : Amurt Beej Ganita.
6. Chandrika Prasad : Text book on Algebra and Theory of Equations, Pothishala Pvt. Ltd, Allahabad.
7. Gokhroo, Saini : Elements of Abstract Algebra
8. Sharma, Purohit : Elements of Abstract Algebra

PAPER CODE-9358

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

FIRST YEAR B. Sc. MATHEMATICS 2016-17

PAPER-II

CALCULUS

Duration: 3 Hours **Max. Marks: 75**

UNIT-I

Polar coordinates and derivatives of arc, polar subtangent and subnormal, pedal-equation, Roll's Theorem, Mean Value Theorems, Taylor's Theorem, their proofs, verifications and applications.

UNIT -II

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

UNIT – III

Beta Gamma functions and their properties. Quadrature, Rectification.

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 S. K. Kaushik : An Introduction to Real Analysis, S. Chand & Co., New Delhi-11, 2000.
5. Bansal, Bhargava : Avakalan Ganita-II
6. Bansal, Bhargava : Samakalan Ganita-Il
7. Gokhroo, Saini : Uchch Avakalan Ganita.
8. Gokhroo, Saini : Uchch Samakalan Ganita.
9. Bansal, Bhargava & Agrawal : Avkal Samikaran I .
10. Gokhroo, Saini, Kumbhat : Avkal Samikaran.

PAPER CODE-9359

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

FIRST YEAR B. Sc. MATHEMATICS 2016-17

PAPER –III GEOMETRY

Duration: 3 Hours **Max. Marks: 75**

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 conic, polar equations of tangent, perpendicular lines and normal, director circle of the conic.

UNIT-III

Plane and straight line: Equation to represent two planes and angle between them, projection on a plane area of a triangle and volume of tetrahedron. Equations of line intersecting two lines, skew lines, shortest distance between two lines, intersection of three planes and three lines.

UNIT- IV

Sphere: General Equation, Tangent Plane, Pole and Polar, Intersection of two spheres, Radical plane, Radical line, Radical centre, Co-axial spheres, Limiting points.

Cone: Enveloping cone, Tangent plane, Reciprocal cone, Three mutually Perpendicular generators, Right circular cone.

Cylinder: Right circular cylinder, Enveloping cylinder

UNIT-V

General equation of second degree in three dimensions. Intersection of a line and a conicoid. Tangent lines and Tangent plane. Condition of tangency, plane section with a given centre. Diametral plane. Principal planes, principal directions and plane sections.

References:

1. Gorakh Prasad and H.C. Gupta : A Text book of coordinate 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 Three Dimensions.
4. P.K. Jain and Khalil Ahmed : A Textbook of Analytical Geometry of Three Dimensions, Wiley Eastern Ltd., 1999.
5. N.Saran and R.S.Gupta : Analytical Geometry of Three Dimentions. (Pothhishala)
6. Bansal, Bhargava : Dwivim Nirdeshank Jyamiti
7. Gokhroo, Saini : Dwivim Nirdeshank Jyamiti
8. Gokhroo, Saini : Trivim Nirdeshank Jyamiti
9. Bansal, Bhargava : Trivim Nirdeshank Jyamiti.
10. Golas, Tandon, Bhargava : Analytical solid Geometry.

SECOND YEAR

Course No.	Nomenclature
Course 11	Learning & Teaching
Course 12	Pedagogy of School Subject I
Course 13	Pedagogy of School Subject II
Course 12 & 13	1. Pedagogy of General Science
	2 Pedagogy of Physics

	3. Pedagogy of Chemistry
	4. Pedagogy of Zoology
	5. Pedagogy of Botany
	6. Pedagogy of Mathematics
Course 14	**Pre-Practice Teaching (Internal Assessment)**
	a) Practicing teaching Skill
	b) T.L.M. Workshop in each Subject
	c) Simulated teaching
Course 15	**Open Air Session / SUPW Camp (Internal Assessment)**
Course 16	**Core Subject***
	Elementry Computer Application
	Practical

Course 17	**Physics I**
	Physics II
	Physics III
	Physics Practical
Course 18	**Chemistry I**
	Chemistry II
	Chemistry III
	Chemistry Practical
Course 19	**Zoology I**
	Zoology II
	Zoology III
	Zoology Practical
Course 20	**Botany I**
	Botany II
	Botany III
	Botany Practical
Course 21	**Mathematics I**
	Mathematics II
	Mathematics III

PAPER CODE-9471

LEARNING AND TEACHING

Objectives:- After completing this course, the student-teachers will be able to :

1. Understand the process of learning and different approaches to the teaching learning process.
2. Apply psychological principles in the teaching learning process.
3. Understand the concept of motivation and strategies to develop motivation and use the motivational devices during teaching learning process.
4. Apply transfer of learning to foster maximum positive transfer.
5. Identify and cater to the educational needs of children with learning difficulties.
6. Develop an understanding of cognitive processes.
7. Understand various factors that influence learning.
8. Understand the concept, principles of teaching and models of teaching.
9. Develop an understanding of various approaches of teaching.
10. Understand the management of teaching.
11. Understand the role of professional organizations in professional development of teachers.

COURSE CONTENT

UNIT-I Learning and Motivation

1. Learning- Concept and Factors Affecting Learning.
2. (a) Approaches to Learning:
   Cognitive : Gestalt (Werthimier, Kofka, Kohler)
   Behaviorist : (Pavlov, Thorndike, Skinner)
   Social Cognitive: Bandura
   (b) Relevance and the applications of the above approaches to learning.
3. Transfer of Learning – Meaning, Types of Transfer and Teaching for Transfer.
4. Motivation– Concept and Significance, Types of Motivation (Intrinsic and Extrinsic), Maslow's Hierarchy of Needs and Motivational Devices for Classroom Teaching.

UNIT- II Individual Differences and Cognitive Processes

1. Individual differences – Nature, Types, Causes, Accommodating individual differences in classroom.
2. Understanding differences based on cognitive abilities in children with learning difficulties (for instance, slow learner, dyslexic).
3. Cognitive Processes-Sensation, Perception, Attention, Memory, Concept formation and Problem Solving in Learning.

UNIT- III Teaching and Teaching Process

1. Teaching:

1. Concept and Nature of Teaching.
2. Relationship between Teaching and Learning.
3. Principles of Teaching.
4. Levels and phases of teaching.
5. Components of Teaching: Teacher, Student, Teaching-Learning material and Classroom climate.
6. Interrelatedness of objectives, teaching learning experiences and evaluations.
7. Content analysis and Task analysis.

2. Teaching Process:

1. Teaching Technology: Concept, Assumptions, Characteristics and Components – Planning, Organisation and Evaluation.
2. Approaches to teaching- Participatory, Child Centered, Constructivist and Investigatory – Their meaning, characteristics and use in teaching.
3. Criterion of effective teaching, Methods of assessment of teaching (Classroom observation, Peer assessment, Self reporting and Evaluation by a supervisor).
4. Teacher behaviour during Teaching: Flander‟s Interaction Analysis System.

UNIT- IV Models of Teaching

1. Concept of models of teaching.
2. Elements of Models of Teaching.
3. Families of Models of Teaching.
4. Types of Models of Teaching - Richard Suchman‟s Inquiry Training Model, Glaser‟s Basic Teaching Model, Information Processing Model and Concept Attainment Model

UNIT-V Teaching as a Profession

1. Definition and characteristics of a profession.
2. Teaching as a Profession: why and how.
3. Professional Ethics for Teachers.
4. Strengthening Teaching Profession

a) Role of Teachers Organizations at state and national level.

b) Role of Educational Organizations in the professional development of teachers (UGC, NCTE, NCERT, Universities and SIERT)

c) Role of Teacher Education Institution in the professional development of teachers.

d) Role of School and Community in enriching Teaching Profession

5. Balancing personal aspirations and professional obligations by teachers.

SESSIONAL WORK

The student teachers shall undertake any two of the following activities (one from each section)

I –Section-A

1. Preparing a teaching plan based on constructivist approach / child centered approach / activity based learning.
2. Case study of a child with learning difficulties.
3. A comparative study of learning of children belonging to different socio-cultural background.

II- Section-B:

1. Study and report on pressures on school teachers.
2. Observation of one student-teacher‟s behavior during one teaching period (using Flander‟s Interaction Analysis System).
3. Collection of few success stories of teachers.
4. A case study of a professional organisation of teachers.

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PAPER CODE-9491

Course 12&13 - PEDAGOGY OF GENERAL SCIENCE

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

1. Develop understanding of the nature of science.
2. Develop understanding of the concept of General Science, its importance and its correlation with other subjects.
3. Appreciate the contribution of Indian and foreign scientists in development of Science.
4. Develop scientific attitude and scientific creativity among students.
5. Develop an understanding of aims and objectives of General Science.
6. Develop an ability of preparing annual plan, unit plan and daily teaching plan.
7. Develop ability to use various methods and approaches of teaching General Science.
8. Develop an ability to construct an achievement test
9. Use continuous and comprehensive evaluation.

COURSE CONTENT

UNIT – I Nature of Discipline

1. Science as a domain of enquiry and characteristics of a scientific enquiry Observation, steps in
scientific method.
2. Science as a dynamic body of knowledge
3. Values developed through Science
4. Contributions of Eminent Indian and western Scientists. – Jagdish Chandra Bose, Dr. Hargobind Khorana, Birbal Sahani, Salim Ali, Darwin, Mendel Watson & Crick and Alfred Nobel,

UNIT –II General Science as a Subject in School Curriculum

1. Place and importance of General Science in school curriculum.
2. Correlation of General Science with other subjects.
3. Changing trends and goals of teaching General Science with references to NCF-2005 (position
paper).

UNIT – III Pedagogy of General Science

1. Aims and objectives of teaching General Science.
2. Writing objectives in behavioral terms.
3. Developing scientific attitude, scientific temper and creativity through teaching of General Science.
4. Content cum Pedagogical analysis of following topics of General Science.
5. Matter in our surrounding; Natural resources; Our environment; Natural disasters

UNIT – IV Planning and Strategies of Teaching-learning General Science-

1. Preparation of annual plan, unit plan and daily teaching plan.

2. Inquiry approach, constructivist approach, investigatory approach, Computer assisted learning,
concept mapping, collaborative learning.

3. Lecture cum demonstration method, Laboratory method, Heuristic method, Project method, problem solving method, Inductive –deductive method, Panel discussion.

UNIT – V Assessment and evaluation in General Science

1. Concept of Evaluation.
2. Types of items.
3. Construction of achievement test.
4. Home assignment – Planning and evaluation.
5. Importance and construction of diagnostic test, remedial program.
6. Concept and advantages of – Continuous and Comprehensive Evaluation (CCE)

PRACTICUM / SESSIONAL WORK

Any two of the following:-

1. Life sketch and contribution of any one prominent biological Scientist.
2. Make a scrap Book on any Environmental issue.
3. Planning, conducting and reporting of an investigatory project.
4. Abstract of two papers related to General Science published in reputed journals
5. Identify the difficulties of students in conducting General Science practical.
6. Identify weak students of General Science and plan a diagnostic and remedial programe for them.

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PAPER CODE-9492

Course 12&13- PEDAGOGY OF PHYSICS

Objectives: On completion of the course the student teachers will be able to:

1. Understand the nature of Science as discipline and Physics as a branch of Science
2. Appreciate the contribution of Indian and Foreign Physicists in the development of Physics.
3. Acquire the understanding of the methods and processes of science that lead to exploration, generation and validation of knowledge in science/physics.
4. Appreciate the issues at the interface of science, technology and society
5. Develop the skill of planning teaching learning activities.
6. Develop competencies in

(a) Selection and use of teaching methods, approaches and devices.

(b) Selection, preparation and use of cost effective teaching aids.

(c) Inculcation of scientific attitude, scientific temper and science related values.

7. Understand role and limitations of language in physics
8. Organise interactive child centered teaching learning by understanding of the learner
9. Conduct pedagogical analysis for planning of instruction
10. Prepare teaching plan using process skills.
11. Prepare, administer and analyze achievement tests for evaluation of learning outcomes of Physics

COURSE CONTENT

UNIT -I Nature of Science as Discipline

1. Nature of Science: as a domain of enquiry, as a dynamic and expanding body of knowledge, as a process of constructing knowledge.
2. Pedagogical shift from science as a fixed body of knowledge to process of constructing knowledge.
3. Scientific Literacy as universal goal of science education : meaning, functions
4. Objectives of teaching science as given by AAAS, NCF-2005,NCERT
5. Relationship of Science, Technology and Society
6. Teacher"s role in training students in scientific method, critical thinking and developing scientific attitude, scientific temper and using these for solving problems of everyday life, nurturing natural curiosity and creativity in science
7. Application of the knowledge of physics for human welfare
8. Values and ethics of science as discipline

UNIT -II Nature and Objectives of Teaching Learning Physics

1. Nature of Physics as a branch of science

2. Facts, Concepts, Principles, laws and Theories-their characteristics in context of Physics (citing examples for each)
3. Place and importance of Physics in school curriculum
4. Development of Science Process Skills through learning of Physics(Teacher Educator will illustrate each taking examples from specific content of Physics).
5. Interdisciplinary fields of Physics viz. Biophysics, Geophysics, Metro physics, Psychophysics etc.
6. Major milestones in the history of development of physics as a branch of science.
7. Contributions of Eminent Physicists: C.V.Raman,Vikram Sarabhai,Homi Jehangir Bhabha,A.P.J.Abdul Kalam ,Albert Einstein, Issac Newton,Stephen Hawkins
8. impact of physics on modern Indian society with reference to issues related with Environment,
Globalization, Industrialization, Information Technology and Peace
9. Taxonomy of educational objectives: meaning and use of classification, aims and objectives of
teaching physics.
10. Developing Feeling and Values(Affective aspect of science) through teaching of Physics.

UNIT- III Exploring Learner

Motivating learners to bring his/her previous knowledge gained in physics through classroom/environment/parents and peer group; Cultivating in teacher-learner the habit of listening to child; Generating discussion, involving learners in teaching-learning process; Encouraging learners to raise questions, appreciating dialogue amongst peer group; helping learner to develop the attitude of rational problem solver Encouraging learners to collect materials from local resources, and to develop/fabricate suitable activities in Physics (individual or group work)
Children"s conceptualization of scientific phenomenon with focus on physics at upper primary and
secondary levels with linkages to primary level
Role of language and its contribution towards expression, articulation and understanding of Physics

UNIT-IV Approaches and Strategies of Learning Physics:

1. Concept approach – meaning of concept, concept formation with reference to J. Bruner and Hilda Taba
2. Process approach – teaching science as a process, scientific method, problem solving method.
3. Cooperative learning approach
4. Activity based approach – investigatory approach, project method, laboratory method
5. Individualized instruction, computer assisted instruction
6. Demonstration-cum-discussion method

7. Presentation (Lecture) method by using advance organizers

8. Constructivist approach Use of different approaches to develop scientific attitude and important values through teaching of Physics

UNIT- V Pedagogical Analysis, Planning for Instruction and evaluation.

1. Pedagogical Analysis:

a) Content Analysis: Identification of units, themes ,concepts ,generalizations ,problems or issues

,knowledge organization in CBSE/RBSE Text books of upper primary and secondary levels. Identification of concepts and teaching points, themes or issues through which scientific attitude or important values can be developed

b) Concept Mapping of the lesson ,unit or theme to be taught

c) Pedagogical Analyses of the following units: Mechanics, Sound, Electricity,Heat and Light with content analyses, expected learning outcomes(Specific Objectives in Behavioral Terms) , Teaching-Learning experiences and activities to be conducted ,evaluation techniques

2. Developing Yearly Plan, Unit Plan and daily teaching Plans on different approaches

3. Evaluation of learning of Physics:

a. Meaning and significance of formative, summative, continuous and comprehensive evaluation.

Continuous assessment - developing learner profiles and portfolios; participatory and peer Assessment

b. Construction of test items of different types to assess factual knowledge ,higher order mental

processes, critical thinking and creativity

c. Preparation of blue print and achievement test, administration and item analysis.

d. Diagnostic testing and remedial teaching in physics.

e. Using assessment feedback to improve teaching of and learning of Physics,

f. analyses of question papers of Physics set by State/CBSE boards

SESSIONAL WORK

Any two of the following:

1. Prepare list of famous Physicists in chronological order from all over the world, starting from Galileo and write major contributions of any one these physicists.
2. Life history and contribution in Physics of one noble prize winner in Physics
3. An essay on impact of Physics on modern Indian society with reference to issues related with

Environment, Globalization, Industrialization, Information Technology and Peace.

4. Report of an experimental project to be completed.
5. Collection of current issues related to science from news papers with comments.

6. Identify weak students in Physics of any one class and prepare a diagnostic test of physics and plan for remedial teaching

7. Construction, administration, scoring and item analyses of examination Paper of Physics set on Board Pattern.

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PAPER CODE-9493

Course 12 & 13 - PEDAGOGY OF CHEMISTRY

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

1. Develop an understanding of the Nature of Science.
2. Develop an understanding of the nature of Chemistry and its correlation with other subjects.
3. Develop scientific attitude and scientific Literacy
4. Develop an understanding of Pedagogy of Chemistry
5. Appreciate recent achievement of chemistry and the contribution of Indian and Foreign Scientists in development of Science.
6. Develop an understanding of aims and objectives of Chemistry teaching.
7. Develop an ability of preparing annuals plan, unit plan and lesson plan.
8. Develop an ability to plan and conduct innovative projects in chemistry.
9. Organize co-curricular activities related to chemistry teaching.
10. Develop an ability to construct and use an achievement test, diagnostic test and remedial measures in Chemistry.
11. Use continuous and comprehensive evaluation.
12. Develop skills related to teaching of chemistry such as Observation, Demonstration, Experimentation, Handling Scientific Apparatuses etc.
13. Use appropriate learning resources.
14. Involve learners in listening, interacting, discussion, dialogue etc.

COURSE CONTENT

UNIT-I Nature of Discipline

1. Nature of Science
2. Developmental perspectives of science.
3. Process skills in Science such as Observation, Demonstration, Experimentation, Handling Scientific Apparatuses etc.

4. Scientific attitude, Scientific Literacy, role of Science in removing ignorance and superstitions.

5. Impact of Science on Society and Vice Versa

6. Contribution of eminent Indian and Foreign Scientific viz Neel Bohr, Marry Curie, C.V. Raman, S.S. Bhatnagar, J.C. Bose, Newton, Einstein, Hargovind Khurana

UNIT-II Chemistry as a Subject in school Curriculum

1. Essential Characteristic of Chemistry as a subject

2. Aims and Objectives of Teaching learning chemistry

3. Importance of Chemistry in School Curriculum

4. Correlation of Chemistry with other subjects

5. Recent Scientific achievements in Chemistry (God Particle Boson, New elements in periodic table. Fuel form Bio-waste, Liquid air as a fuel)

6. Chemistry in daily life.

UNIT-III Pedagogy of Chemistry

1. Content cum Pedagogical analysis of following topics of Chemistry Atomic Structure; Nuclear Chemistry; Chemical Bonding; Periodic Table; Hard and Soft water; Aromatic Compounds

2. Important skills for classroom teaching - Listening the child, bringing previous knowledge gained through parents, peer group in learning process and interaction, Generating discussion, Encouraging questions of students and dialogue amongst peer group.

3. Methods of Teaching Chemistry Lecture cum demonstration method; Inductive – deductive method; Heuristic method; Scientific method; Project method; Computer Aided Instruction; Constructivist approach; Brain storming; llaborative learning

(3) Projects in Chemistry

UNIT- IV Learning Resources

1. Science Lab. – Structure and design of Chemistry laboratory.

2. Low cost apparatus, use of local resources.

3. Alternative resources for challenged learners

4. Teaching – Learning material viz charts, models, flannel board, OHP, Computer, Projector.

UNIT-V Assessment and Evaluation

1. Concept of continuous and comprehensive evaluation, Formative and Summative Evaluation

2. Different types of questions, Blue print and construction of Achievement Test.

3. Diagnostic and Remedial measures

4. Self Evaluation, Peer Group Evaluation and Teacher Evaluation

5. Assessment Indicators of practical examination in Chemistry Such as Handling of Apparatus,

following Systematic Approach, Correct Conclusion, Understanding Cause Effect Relationship of

given Experiment, Viva-Voce and Reporting.

PRACTICUM/SESSIONAL

Any Two from following –

Practicum No. 1 is compulsory for all

1. Preparation of kit for Demonstration of five experiments on any Topic related to chemistry covered in the syllabus of class VI to X.
2. Preparation of a low cost apparatus/Improvised apparatus. (Other than submitted during internship)
3. Analysis of a given Salt – Identifying Acid and Basic Radicals
4. Identification of Protein, Carbohydrate, Fat in a given substance.
5. Identification of Adulteration in some food article such as Ghee, Oil, Milk, Red Chilli powder, Turmeric powder and Pulses etc.

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- ***PAPER CODE-9494***

Course 12&13 - PEDAGOGY OF BIOLOGY

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

1. Develop understanding of the nature of science.
2. Develop understanding of the concept of Biology, its importance and its correlation with other subjects.
3. Appreciate the contribution of Indian and foreign Biologists in development of Biology
4. Develop scientific attitude and scientific creativity among students.
5. Develop an understanding of aims and objectives of Biology.
6. Develop an ability of preparing annual plan, unit plan and daily teaching plan.
7. Develop ability to use various methods and approaches of teaching Biology.
8. Develop an ability to construct an achievement test
9. Use continuous and comprehensive evaluation.

COURSE CONTENT

UNIT – I Nature of Discipline

1. Science as a domain of enquiry and characteristics of a scientific enquiry. Observation, steps in scientific method.
2. Science as a dynamic body of knowledge
3. Values developed through Science
4. Contributions of Eminent Indian and western Biologists. – Jagdish Chandra Bose, Dr. Hargobind Khorana, Birbal Sahani, Salim Ali, Darwin, Mendel and Watson & Crick.

UNIT –II Biology as a Subject in School Curriculum

1. Place and importance of Biology in school curriculum.
2. Correlation of Biology with other subjects.
3. Changing trends and goals of teaching Biology with references to NCF-2005 (position paper).

UNIT – III Pedagogy of Biology

1. Aims and objectives of teaching Biology.
2. Writing objectives in behavioural terms.
3. Developing scientific attitude, scientific temper and creativity through teaching of Biology.
4. Content cum Pedagogical analysis of following topics of Biology.
    a) Diversity of living organism
    b) Biological Classification
    c) Genetics and Evolution
    d) Ecology and Environment

UNIT – IV Planning and Strategies of teaching-learning Biology-

1. Preparation of annual plan, unit plan and daily teaching plan.
2. Inquiry approach, constructivist approach, investigatory approach, Computer assisted learning,
   concept mapping, collaborative learning.
3. Lecture cum demonstration method, Laboratory method, Heuristic method, Project method, problem solving method, Inductive –deductive method, Panel discussion.

UNIT –V Assessment and evaluation in Biology

1. Concept of Evaluation.
2. Types of items.
3. Construction of achievement test.
4. Home assignment – Planning and evaluation.
5. Importance and construction of diagnostic test, remedial program.
6. Concept and advantages of – Continuous and Comprehensive Evaluation (CCE)

PRACTICUM / SESSIONAL WORK

Any two of the following:-

1. Life sketch and contribution of any one prominent biological Scientist.
2. Make a scrap Book on any Environmental issue.
3. Planning, conducting and reporting of an investigatory project.
4. Abstract of two papers related to Biology published in reputed journals
5. Identify the difficulties of students in conducting biology practical"s.
6. Identify weak students of biology and plan a diagnostic and remedial programme for them.

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9 Chauhan S.S. 1985 Innovation in teaching learning process, Delhi, Vikas Publishing House

10 Dale Edgar 1962 Audio Visual Methods in Teaching, New York, Revised edition Hold, Rivehart and winston.

11 Dani D.N. 1989 “Scientific Attitude and Cognitive Style”, Northern Book Centre, New Delhi.

12 Dave, R.H. 1969 Taxonomy of Educational objectives & Achievement, testing London University Press London.

13 Edger. Marlow & Rao, D.B. 2003 Teaching Science Successfully, Discovery publishing House, New Delhi

14 Gupta S.K. 1983 Technology of Science Education Vikas Publishing House Pvt. Ltd. New Delhi

15 Jenkins, E.W. 2000 Innovation in Science & Technology Education Vol. VII UNESCO, Parco

16 Kulshershtha, S.P. 1988 Teaching of Biology, Loyal Book Depot. Meerut.

17 NCERT National Curriculum Framework-2005

18 NCERT Position Paper of NCF on Teaching of Science-2005

19 Sharma R.C. 2005 Science Teaching, Dhanhat Rai publishing Company (P.) Ltd. New

20 Sharma, L.M. 1977 Teaching of Science & Life Science, Dhanpat Rai & Sons, Delhi

21 Singh U.K. &Nayab, A.K. 2003 Science Education, Common wealth Publishers Daryaganj, New Delhi

22 Sood J.K. 1987 Teaching Life Science, Kobli Publisher, Chandigarh

23 UNESCO Source Book for Science Teaching.

24 Vadav, M.S. 2000 Modern methods of teaching Science, Anmol Publisher, Delhi

25 Venkataih S. 2001 Science Education in 21st Century, Anmol Publishers, Delhi

Paper code - 9495

Course 12 & 13 - PEDAGOGY OF MATHEMATICS

Objectives: After completion of course the students will be able to-

1. Gain insight into the meaning, nature, scope and objectives of mathematics education.
2. Appreciate mathematics as a tool to engage the mind of every student.
3. Understand the process of developing the concepts related to Mathematics.
4. Appreciate the role of mathematics in day to day life.
5. Learn important mathematics: mathematics more than formulas and mechanical procedures.
6. Pose and solve meaningful problems.
7. Construct approriate assessment tools for evaluating mathematics learning.
8. Understand methods and techniques of teaching mathematics.
9. Perform pedagogical analysis of various Topics in mathematics at secondary level.
10. Understand and use I.C.T. in teaching of mathematics.
11. Understand and use continuous and comprehensive evaluation, diagnostic testing and remedial teaching in Mathematics.

COURSE CONTENTS

UNIT-I Nature of Mathematics as a Discipline

1. A Mathematics is not merely subject of computations skill , it is much more, it has a logical structure.
2. Nature of mathematics- building blocks of mathematics (Concept, objectives, variables, function & relation, symbolization)
3. Important processes of mathematics-estimation , approximation, understanding or visualizing pattern representation, reasoning & proof, making connections, mathematical communication.
4. Historical development of mathematics as a discipline Contribution of western and Indian mathematicians like Ramanujan, Aryabhatt, Bhaskarcharya, Pythogorous and Euclid.
5. Constructivist approach in learning mathematics.

UNIT-II Mathematics as a School Subject

1. Importance of mathematics in school curriculum.
2. Aims and objectives of Teaching mathematics at secondary level. writing objectives in behavioural terms. Bloom's taxonomy (revised)
3. Correlation of mathematics with other school subjects.
4. Changing trends and goals of teaching mathematics with reference to NCF 2005
5. Concept mapping of themes related to mathematics.

UNIT-III Methodology of Teaching and Learning of Mathematics

1. Nature of concept, concept formation and concept assimilation.
2. Methods of teaching mathematics at secondary level

a. Lecture cum demonstration
b. Inductive-Deductive
c. Problem Solving
d. Project
e. Heuristic
f. Analytic & Synthetic

3. Techniques of teaching mathematics

a. Oral work
b. Written work
c. Drill work
d. Home assignment

UNIT-IV Pedagogical analysis and mode of learning engagement

1. Pedagogical analysis of the units with reference to concepts, learning outcomes, activities and
learning experiences and evaluation techniques of following content at secondary level

a. Number system
b. Measures of central tendency
c. congruency and similarity
d. Trigonometrical ratios and identities
e. Area and Volume
f. Profit, loss and partnership
g. Compound interest
h. Graphical representation of data

2. Modes of learning engagement in mathematics

a. Providing opportunities for group activities
b. Group/ Individual Presentation
c. Providing opportunities for sharing ideas
d. Designing different Working Models for concept formation
e. Teaching aids and activities in laboratory work
f. Reflective written assignments

UNIT-V Assessment & Evaluation of Mathematics learning

1. Assessment of critical thinking, logical reasoning and to discourage mechanical manipulation and rote learning

a. Planning of evaluation in mathematics

b. Formative, Summative and predictive evaluation in mathematics

c. continuous and compressive evaluation (CCE) in mathematics at secondary level

d. Diagnostic Testing, Remedial Teaching and enrichment programme for:

1. Gifted Learners
2. Slow Learners
3. Learners with Dyslaxcia
4. Difficulties Faced by the Teacher in Teaching of Mathematics and Suggestive Measures to overcome them.

2. Construction of achievement test/ question paper in mathematics

SESSIONALS /PRACTICUM

Any two of the following:

1. Preparing a Diagnostic or Achievement Test.
2. Preparing one innovative lesson plan.
3. Conduct at least one Experiment on any topic of mathematics.
4. Prepare Instructional Material for teaching one topic in Mathematics.
5. A term paper on a brief History of one mathematician.
6. Preparing a working model.
7. A project report on any project related to mathematics.

SUGGESTED READINGS

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12. Grouws, D.A. (ed) (1992) Handbook of Research on Mathematics Teaching and Learning.

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35. Joanna O. Masingila & Frank K. Lester (1988). Mathematics via Problem Solving (Student Resource), New York: Printice Hall Inc.
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47. Activity for Junior High School and Middle School Mathematics, Vol. II NCTM, USA, 1999
48. Geometry- History, Culture and Techniques, J.L. Heilborn, Oxford University, Prss-2000
49. Mathematics, Part I and II Textbook for Class XII, 2007, NCERT, New Delhi
50. Mathematics, Part I and II Textbook for Class XI, 2006, NCERT, New Delhi
51. Mathematics, Part I and II Textbook for Class X, 2007, NCERT, New Delhi
52. Mathematics, Part I and II Textbook for Class IX, 2006, NCERT, New Delhi
53. Secondary School Curriculum, 2006, CBSE, New Delhi
54. Mathematics Laboratory in school- towards joyful learning, 2006 CBSE, New Delhi
55. Guidelines for Mathematics Laboratory in school for class IX, 2006 CBSE, New Delhi
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57. Mathematics for Class VIII, 2008, NCERT, New Delhi
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60. National Curriculum Framework- 2005, NCERT
61. Position Paper of NFG on Teaching Mathematics-2005, NCERT
62. Position Paper of NFG on Habitat and Learning-2005, NCERT
63. Position Paper of NFG on Examination Reforms-2005, NCERT
64. Position Paper of NFG on Aims of Education-2005, NCERT
65. Position Paper of NFG on Gender Issues in Education-2005, NCERT
66. Position Paper of NFG on Education and Peacs-2005, NCERT

Journals:

1. Teaching Children Mathematics(TCM), NCTM, USA

2. Mathematics Teaching in the Middle School(MTMS), NCTM, USA
3. Journal of Mathematics Teacher Education, Springer Netherlands

Web Links:

1. Mathematics Thinking and Learning. Philadelphia, USA
2. http://WWW. mathforum.org/dr.math
3. http://WWW. sakshat.ac.in
4. http://web.utk.edu
5. http://www.confluence.org
6. http://www.nationalmathtrail.org
7. http://www.qsh.org/lists/hilites.html
8. http://www.kn.pacbell.com./wired/bluewebn
9. http://www.qsh.org/pr
10. http://www.education-world.com
11. http://www.nctm.org

Paper code -9484

Couse 14 : INTERNAL EVALUATION

[II YEAR]

Pre Practice Teaching

S. No.	Activity	Marks
1.	Practising Taeching Skill(Minimum 05)	20
2.	T.L.M. Workshop in Each Subject(5+5)	10
3.	Simulated Teaching (5 Lesson in each subject) (5+5)	10
4.	Blue Print & Test Preparation in Both Subject (5+5)	10
	Total Marks	**50**

PAPER CODE-9485

Course 9- OPEN AIR SESSION / SUPW CAMP

Every college will organize 5 days camp in the first year of B.Ed. Course. Participation in such camp will
be compulsory for all students.
Performance of students will be evaluated internally.
Objectives of the camp will be as follows:-
1. To develop understanding about local environment and Community for connecting classroom teaching with outside world.
2. To develop sensitivity towards self, society and environment.
3. To develop feeling of togetherness and working collaboratively.
4. To develop organizational skills and leadership abilities.
5. To develop skill of conducting surveys.
6. To develop an understanding about sustainable future.
7. To develop dignity of labour through community service.

Suggested activities for Open Air Session/SUPW Camp
1. Study of the local environment/ socio cultural issues through survey.
2. Community awareness performance – cleanliness campaigns, plantation, value education, etc.
3. Participation in Health and Spiritual activities like morning Assembly, Yoga, P.T., Meditation, Silence hour.
4. Participation in Aesthetic and recreational activities.
5. Documentation and organization of exhibition for local community.
6. Productive and creative craft activities.

Note : Student teachers will participate in the above mentioned activities in collaborative manner (to develop the feeling of working and living together)

Guideline for assessment Max Marks 50

S. No.	Activity	Marks
1.	Participation in preparation of Camp	5
2.	Presentation of report of survey/ creative work	20
3.	Participation in Community Awareness Programme	15
4.	Participation in organizational process/community living/cultural and aesthetic activities	10
	Total Marks	50

PAPER CODE-9603

SYLLABUS

Elementary Computer applications

Common for Arts, Science & Commerce Faculties

1. **Information concepts and processing:**
   Definition of information, need quality and value of information, categories of information in business organisation level of information, storage and retrieval of data, comparison of manual and electronic storage of data, organisation of data as files ,data processing in govt. ,large business, multinational and private organisation.

2. **Elements of Computer Inter Processing System:**
   The electronic digital computer, the number systems (binary, digital, octal and hexadecimal and their conversions),character code(ASCII and EBCDIC),concept of hardware and software, the architecture of a computer system, CPU, memory and input/output devices, magnetic storage devices, optical device, printers and monitors, categories of software, system software, application software, packages.

3. Classification of Computers and Generation of Computers, parallel processing and component, RISC and CISC machines, development of Intel family processors.

4. **Operating System Concept:**
   The need of an OS(operating system),OS as resource processor and memory Manager, the various types of operating system, MS-DOS,WINDOWS 95/98,WINDOWS 2000,UNIX operating system.

5. **Computer and Communication:**
   Need for data transmission over distances, communication channels: twisted pair coaxial cable, microwave, radio wave, optical fiber and satellite: digital and analog transmission, 15 serial and parallel data transmission, Moderns, Networking of computers, LAN, WAN concepts.

6. **Programming Language:**
   Machine, Assembly and high level language, generation of language, 3 GL and 4 GL language, and graphics User Interfaces.

7. **Personal Computer Software**:
   Word processing packages, Spreadsheet Packages and Database Management Packages, Desktop Publishing, Computer Animation Packages introduction to MS-Office.

8. **Internet Technology:**
   Concept and how it wok, Email service, Internet Surfing, browsers and search engines, World Wide Web, Web Programming, HTML and JAVA Programming Concepts.

9. **E-Commerce:**

What is e-commerce and growth of e-commerce electronic payment systems security considerations, digital currencies, Credit cards, Cybercast, E-cash, smart card, supply chain management.

10. Benefits of electronic forms of data processing and management in education, commerce public delivery systems banking and other financial transactions, new developments in these areas.

Laboratory:

The laboratory exercise will be designed to help in the understanding of the concepts of computer and the utilization in the areas outlined in the theory syllabus. The emphasis should be on practical uses rather than on theoretical concepts only.

PHYSICS

COURSE CURRICULAM

- Paper Nomenclature		Lectures	Duration Of Exam	Max. marks	Min. marks
I	Kinetic Theory, Thermodynamics and Statistical Physics	60 hrs	3hrs	50	18
I I	Optics	60 hrs	3 hrs	50	18
III	Electronics	60 hrs	3 hrs	50	18
IV	Practical	120 hrs	6 hrs	50	27

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-9441

SECOND YEAR T.D.C. SCIENCE

PAPER-I

KINETIC THEORY, THERMODYNAMICS AND STATISTICAL PHYSICS

UNIT – I

Ideal Gas: Kinetic Model, Deduction of Boyle‟s law, Review of the kinetic model of an ideal gas, Interpre-tation of temperature, Brownian motion, Estimate of the Avogadro number, Equipartition of energy, specific heat of monatomic gas, extension to di and triatomic gases, Behaviour at low temperatures, Adiabatic expansion of an ideal gas. Application to atmospheric physics (derivation of barometric equation)

Real Gas: Van der Waals model; equation of state, nature of Van der Waals forces, comparison with experimental P-V curves. The critical constants, gas and vapour. Joule-Thomson expansion of an Ideal gas and Van der Waals gas; Constancy of U+pV, Joule coefficients, Estimates of J-T cooling, adiabatic expansion of an ideal gas.

Liquification of gases : Joule Expansion, Joule-Thomson and adiabatic cooling, Boyle temperature and inversion temperature, principles of regenerative cooling and cascade cooling, Liquification of hydrogen and helium, meaning of efficiency.

UNIT - II

Transport phenomena in gases: Molecular collisions, mean free path and collision cross-sections, Estimates of molecular diameter and mean free path, Experi-mental determination of mean free path. Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure.

Maxwellian distribution of speeds in gas: Derivation of distribution of speeds and velocities, experimental verification, distinction between mean, rms and the most probable speed values. Doppler broadening of spectral lines.

UNIT - III

The laws of thermodynamics: The Zeroth law, Various indicator diagrams, work done by and on the system, First law of thermodynamics, internal energy as a state function. Carnot cycle and its efficiency, Carnot theorem and the second law of thermo-dynamics, Different versions of the second law, Reversible and irreversible changes. Practical cycles used in internal combustion engines. Entropy, principle of increase of entropy. Thermodynamic scale of temperature; its identity with the perfect gas scale. Impossibility of attaining absolute zero; third law of thermodynamics.

Thermodynamic relationships: Thermodynamic variables; extensive and intensive, Maxwell‟s general relationships; applications to J-T cooling and adiabatic cooling in a general system, Van der Waals gas, and the Clausius-Clapeyron heat equation.

Thermodynamic Potentials: Relation to the thermo-dynamic variables, Equilibrium of thermodynamic systems, Cooling due to adiabatic demagnetization.

UNIT - IV

Statistical basis of the thermodynamics:

Probability and thermodynamic probability, principle of equal a *priori* probabilities, probability distribution and its narrowing with the increasing n, average properties, Accessible and inaccessible states, distri-bution of particles with a given total energy into a discrete set of energy states.

Phase space representation: The mu space; its division into sheets of energy, phase cells of arbitrary size, one-dimensional oscillator, free particles, the functions F(E) and W(E), definition of probability.

Black Body Radiation: Spectral distribution of BB radiation; pure temperature dependence, Stefan-Boltzmann law, Wien‟s displacement law, Rayleigh-Jeans law and the ultraviolet catastrophy, Pressure of radiation, Planck‟s hypothesis, mean energy of an oscillator and the Planck‟s law, complete fit with the experiment. Interpretation of specific heats of gases at low temperature.

UNIT-V

The bridge of Statistical physics with thermo-dynamics: Thermal equilibrium between two subsystems, beta parameter and its identity with $(kT)^{-1}$**,** probability and entropy, Boltzmann entropy relation, statistical interpretation of the second law of thermo-dynamics. Boltzmann canonical distribution law; rigorous form of equipartition of energy.

Transition to quantum statistics: ‘h‟ as a natural constant and its implications, cases of particles in a box and simple harmonic oscillator, Setting phase-cell size as nature‟s constant (Planck‟s constant h); quantization of energy. Indistinguishability of particles and its consequences. Bose-Einstein and Fermi-Dirac conditions, applications to liquid helium, free electrons in a metal, and photons in blackbody chamber, Fermi level and Fermi energy.

Text and Reference Books :

1. B.B. Laud, “Introduction to Statistical Mechanics” (Macmillan 1981)
2. F. Reif, “Statistical Physics” (McGraw-Hill, 1988)
3. K. Huang, “Statistical Physics” (Wiley Eastern, 1988)

PAPER CODE-9442

PAPER-II

OPTICS

UNIT-I

Format’s Principle : Principle of experiments path, the aplantic points of a sphere and other applications.

General theory of image formation : Cardinal points of an system; general relationship; thick lenses and lens combinations, telephoto lenses.

Aberration in images : Chromatic aberration ; achro-matic combination of lenses in contact and separated lenses. Monochromatic aberrations and their redu-ction; spherical mirrors and schmidt corrector plates; oil immersion objective, meniscus lenses.

Optical instruments : Entrance and exit pupils, need for a multiple lens eye pieces. Common type eye pieces.

UNIT – II

Interference of Light: The principle of superposition ; two slit interference, coherence requirement for the sources, localized fringes in this films, transition from fringes of equal thickness to those of equal inclination, Newton‟s rings, Michelson interferrometer its uses for determination of wavelength, wavelength difference and standari-zation of meter. Intensity distribution in multiple beam interference, Febry-Perot interferrometer and etalon. Lummer Gehrke plate, Lloyds mirror.

UNIT – III

Diffraction of light

Fresnel diffraction : Half period zones, circular aper-ture and obstacles; straight edge, explanation of recti-linear propagation, Zone plate with multi focii

Fraunhofer diffraction : Diffraction at a slit, a circular aperture and a circular disc, resolution of images; Rayleigh criterion. Resolving power of a telescope and microscope, outline of phase contrast microscopy.

Diffraction grating : Diffraction at N parallel slits, plane diffraction grating, concave grating resolving power of grating and prisms.

UNIT – IV

Polarization of light

Double refraction and optical rotations : Double refra-ction in uniaxial crystals, explanation interms of electromagneties theory, Malus Law, Phase retarda-tion plates, rotation of plane of polarization, origin of optical rotation in liquids and in crystals. Babinet Compen-sator, Polarimters and their applications in measure-ment of specific rotation.

Dispersion and Scattering : Theory of dispersion of light, absorption band and anomalous dispersion theory of Rayleigh Scattering.

UNIT - V

LASER

Laser System : Purity of spectral line; Coherence length and coherence time, spatial coherence of a source; Einstein‟s A and B coefficients; Coherence of induced emissions, conditions for laser action, exis-tance of a metastable state, population inversion by pumping and cavity. He-Ne and Ruby Laser

Application of lasers : Spatial coherence and direction-ality, estimates of Laser and non linear optics : Polari-zation P including higher order terms in E and gene-ration of harmonics. Momentum mismatch and choice of right crystal and direction for compensation.

Recommended Books

1. Principle of Optics : B. K. Mathur (IIIrd edition)
2. Text book of Optics : Subrahmanyam and Brijlal (S.Chand and Co.)
3. Optics : Jankins and White (McGraw Hill)
4. Text book of Optics : D. P. Khandelwal
5. Universities Optics Vol. I & II : Whittkar and Yarwood
6. Optics : Ajay Ghatak (Tata McGraw Hill)

PAPER CODE-9443

PAPER-III

ELECTRONICS

UNIT-I

Basic circuit analysis:

Voltage and current sources, Open and Short Circuits, Kirchoff‟s laws, Voltage and current divider rules, Mesh and node analysis, Principle of superposition, Thevenin‟s and Norton‟s theorem, Maximum Power transfer theorem.

Semiconductor diodes:

p-n junction diodes, I-V characteristics, diode as a rectifier, half wave, full wave and bridge rectifiers, clippers and clampers, Zener, varactor diode and their applications, Optoelctronic diodes: LED and Photo-diodes.

Bipolar Junction Transistors (BJT) :

Basic construction of pnp and npn transistors and their operation, Input and output characteristics of CB, CE and CC configurations, Biasing methods, active, saturation and cutoff regions, load line concepts, Graphical analysis of CE configuration and phase relationship.

Field effect transistors:

Basic constructions of JFET and MOSFET, Drain characteristics of JFET, biasing of JFET, operating regions, pinch-off voltage.

UNIT-II

Small signal amplifiers:

General amplifier characteristics, Two port analysis of a transistor, definition of h- parameters, current gain, voltage gain and power gain of an amplifier, Input and output resistances, Analysis of CB, CE and CC amplifiers for current gain, voltage gain, input and output impedences using h – parameters, Decibel power, Classifications of amplifiers, class A, B, AB and C amplifiers (graphical treatment only), RC coupled transistor amplifier, Gain frequency response, and high frequency limitations. Transformer coupled amplifer.

UNIT III

Feed back amplifiers:

Basics of Negative feedback, Merits and demerits of negative feedback and its applications, Voltage series amplifier (Emitter follower) and Current series amplifier (CE amplifier with and without bypass capacitor).

Oscillators:

Positive feedback, Barkhausen criterion, Phase shift oscillator, Colpitt‟s and Hartley oscillators, and Crystal oscillator.

Operational Amplifiers:

Characteristics of Operational amplifiers, circuit symbols, ideal and practical op-amp, Inverting and noninverting configurations, Applications of OP-AMP as an adder, subtractor, inverter, scale changer, phase shifter, differentiator and integrator.

UNIT-IV

Digital Electronics:

Binary, Octal, decimal and hexadecimal numbers and their inter conversions, 1‟s and 2‟s compliments of binary numbers, addition and subtraction of binary numbers, OR, AND, NOT, NAND, NOR and XOR gates and their symbols and truth tables, Boolean algebra, DeMorgan‟s theorem, minterms and maxterms, sum of minterms and product of maxterms forms of Boolean functions, simplifications of Boolean function using Karnaugh‟s map (up to 4-variables).

UNIT-V

Modulation:

Basics of modulation, amplitude and frequency modu-lation, sidebands, Comparison between AM and FM, power of amplitude modulation and spectrum, AM and FM transmitters (Block diagram and principle of operation only).

Demodulation:

Demodulation of AM and FM waves, linear envelope detector, Hetrodyne and superhetrodyne receiver (Block diagram and principle of operation only).

Cathode Ray Oscilloscope:

Cathode ray tube-theory and construction, Cathode Ray Oscilloscope (Block diagram and operation), Appli-cation of CRO, wave form display, frequency, phase and amplitude determination, Lissajous figures.

Recommended Books:

1. Electronic Devices and Circuit theory by R. Boylestead and L. Nashelsky (Prentice Hall of India).
2. Foundations of Electronics by D. Chattopadhyaya, P.C. Rakshit, B. Saha and N.N. Purkait (New Age International (P) Limited Publishers).
3. Electronic Devices by Allan Mottershed (Prentice Hall of India).

4. Digital fundamentals by Thomas L Floyd (Unuited Book Stall, New Delhi).
5. Electronic fundamentals and applications by John D. Ryder (Prentice Hall of India).
6. Electricity and Magnetism by K.K. Tewari (S. Chand & Company Limited).

PAPER CODE-9444

PAPER-IV

PHYSICS PRACTICAL

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

(i) Two experiments 48 Marks

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

Figure :	3
Formula/Theory :	3
Observation :	10
Calculation and Result :	6
Precautions :	2
(ii) Viva voce	12
(iii) Records	15
Total	**75 Marks**

MAX. MARKS :75

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

LIST OF EXPERIMENTS

Section-A

1. Determination of the size of the Lycopodium grains using Cornu‟s method.
2. Determination of wavelength of Mercury light using grating
3. Determination of resolving power of grating
4. Determination of dispersive power of the glass prism
5. Determination of wavelength of sodium light using Fresenel‟s biprism
6. Determination of wavelength of sodium light using Newton‟s rings
7. Determination of specific rotation of cane sugar solution using polarimeter.
8. Determination of wavelength of ultra sonic wave.
9. Determination of focal length of a high power microscope objective.
10. Measurement of absorption by a solution.
11. Study of aberrations of a thick lens.
12. Study of interference fringes in thin films of the following (not all)

(a) Thermal expansion of a crystal using interference fringes.

(b) Bending of a glass plate under load.
(c) Bending of a rod under load.
(d) Use of Newton‟s ring to determine the radii of curvature of surfaces.
(e) Use of fringes in wedge film .
13. Resolving limit of the eye and of a telescope with a variable aperture.
14. Fresnel diffraction at a straight edge and a slit.
15. Fraunhoffer diffraction at a single slit.
16. Resolving limits of grating and prism.
17. Study of polarization of the light by simple refle-ction.
18. Verification of Cauchy‟s relation using Prism and Gratting.

Section-B

1. To draw characteristic curves of Common emitter transistor and calculate its hybrid parameters.
2. To study gain and frequency response of a single stage Common emitter amplifier.
3. To determine varactor diode characteristics.
4. To draw characteristics of Zener diode and calcu-late voltage regulation factor.
5. To study ripple factor and internal resistance of a solid state power supply using LR,CR and Pi filter using a CRO
6. To find barrier height of a given solid state diode.
7. Use of p-n junction for the measurement of temperature.
8. Design and construction of phase shift oscillator.
9. Design, build and test of a lograithimic amplifier.
10. Study of a function generator using Operational Amplifier.
11. Study of NAND and NOR circuits (discrete and IC) XOR and De Morgans Theorem.
12 Study of multiplixures and demultiplexures.
13 Study of half adder and full adder circuit.
14. Study RS, D and JK flip - flops.
15. Study of Modulo- 3 , Modulo-5 and Modulo-7 binary counter circuits.
16. Study of characteristics of a thermistor.
17. Determination of solar constant or temperature of an oven through radiation measurement.
18. Resistance thermometry: temperature of a torch bulb filaments from R value, platinum resistance thermometry.

PAPER CODE-9445

SECOND YEAR B.Sc CHEMISTRY 2017-18
Effective from session 2016-17

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 I : INORGANIC CHEMISTRY

UNIT I

Chemistry of Elements of First Transition Series : Characteristic properties of d-block elements (colour variable valency, magnetic and catalytic properties and ability to form complexes). Properties of the elements of the first transition series, their binary compounds and complexes illustrating relative stability of their oxidation states, coordination number and geometry.

Chemistry of Elements of Second and Third Transition Series : General characteristics, comparative treatment with their 3d-analogues in respect of ionic radii oxidation states, magnetic behaviour, spectral properties and stereochemistry.

UNIT II

Oxidation and Reduction : Use of redox potential data analysis of redox cycle, redox stability in water- Frost, Latimer and Pourbaix diagrams, principles involved in the extraction of the elements.

Coordination Compounds : Werner's coordination theory and its experimental verification, effective atomic number concept, nomenclature of coordination compounds, isomerism in coordination compounds valence bond theory of transition metal complexes, chelate and chelate effects.

UNIT III

Chemistry of Lanthanides : Electronic structure, oxidation states and ionic radii, lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.

Chemistry of Actinides : General feature and chemistry of actinides, chemistry of separation of Np, Pu and Am from U, similarities between the later actinides and the later lanthanides.

UNIT IV

Gravimetric Analysis : Principles, solubility, formation and preparation of precipitation, colloidal properties, ageing and contamination of the precipitates, co-precipitation and post-precipitation.

Simple Organic Reagents used in Inorganic Analysis : 8-Hydroxyquinoline, Dimethylglyoxime, α-nitroso-β-naphthol, Anthranilic acid, Arsenic acid, Cupron and Cupferron.

UNIT V

Chromatography : Basic principles, instrumentation and application of adsorption and partition chromatography, ion exchange separation.

Errors in Quantitative Analysis : Accuracy and precision, determinate, indeterminate and accidental errors, precision of a single measurement, precision of mean rejection of result, errors in a derived result methods of checking the accuracy of analysis, significant figures, computation values.

BOOKS RECOMMENDED

1. Text Book of Quantitative Inorganic Analysis : A.I. Vogel (Chapter I, II and XXIII).
2. Text Book of Quantitative Inorganic Analysis : I.M. Kolthoff and E.R. Sandell.
3. Concise Inorganic Chemistry : J.D. Lee.
4. General Inorganic Chemistry : J.A. Duffy.
5. Principle of Inorganic Chemistry : B.R. Puri and L.R. Sharma.
6. Basic Inorganic Chemistry : Cotton and Wilkinson and Gaus. Willey.
7. Inorganic Chemistry (Hindi ed.) : Suresh Ameta, A. Sharma and M. Metha, Himanshu Pub.

PAPER II : ORGANIC CHEMISTRY

Time : 3 Hrs. **M.M. 50**

UNIT I

Alcohols and Epoxides :

Unsaturated alcohols - Vinyl and Allyl alcohol.

Dihydric alcohol - Nomenclature, method of formation and chemical reactions of vicinal glycols.

Pinacol - Pinacolone rearrangement.

Trihydric alcohols - Formation and chemical reactions of glycerol.

Epoxides - Synthesis and reactions of epoxides, orientation of epoxide ring opening.

Phenols - Nomenclature, structure and bonding preparation of phenols, physical properties and acidic character, comparative acidic strength of alcohols and phenols, resonance stabilization of phenoxide ion.

Reactions of phenols - Electrophillic aromatic substitution, acylation and carboxylation, Mechanism of Fries rearrangement, Clasien rearrangement, Gatterman synthesis. Hauben=Hoesch reaction, Ledgerer Manasse reaction and Reimder-Tiemann reaction.

UNIT II

Aldehydes and Ketones : Synthesis, chemical and physical properties of aromatic aldehydes and ketones, mechanism of nucleophilic addition to carbonyl group with particular emphasis on Benzoin, Aldol, Perkin and Knoevenagel condensations, condensation with ammonia and its derivatives, Witting reation, Mannich reaction.

Use of acetals as protecting group, Oxidation of aldehydes, Baeyer, Villiger oxidation of ketones, Cannizzaro reaction, MPV, Clemmenson, Wolff-Kishner, $LiAlH_4$ and $NaBH_4$ reductions, Halogenation of enolizable ketones.

UNIT III

Carboxylic Acids and their derivatives : Nomenclature, structure and bonding, acidity of carboxylic acids, effects of substituents on acid strength, mechanism of decarboxylation, Methods of formation, physical properties and chemical reactions of dicarboxylic acids, oxalic, succinic and phthalic acid.

Substituted Acids - Methods of formation and chemical reactions of halo acids, hydroxy acids, malic, tartaric, citric and salicyclic acids.

Unsaturated Acids - Acrylic and cinnamic acids.

Introduction to acids derivatives - Preparation, properties and uses of acid halides, amides, anhydrides and esters. Interconversion of acid derivatives by nucleophilic acyl substitution. Mechanism of HVZ reaction, Hofmann - bromamide reaction and ester hydrolysis.

UNIT IV

Organic Compounds of Nitrogen : Preparation and chemical reactions of nitroarenes. Reactivity of nitro substituted arenes.

Aromatic amines, classification, preparation, properties and uses of primary amino compounds aniline, acetanilide, nitroanilines.

Secondary amino compounds - diphenylamine and N-methylaniline.

Tertiary amino compounds - Triphenylamine and N,N-dimethylaniline.

Aryl alkyl amine - Benzylamine.

Basic strength of amines - similarities and differences between aliphatic and aromatic amines.
Diazonium salt - formation, properties and synthetic uses of benzene diazonium salt, Diazo coupling and its mechanism.

Organic Sulphur Compounds : Preparation and properties of thiols, sulphonic acid, sulphonyl chloride, saccharides, chloramine -T. dichloramine-T and sulphonamides.

UNIT V

Polynuclear Hydrocarbons : Nomenclature of naphthalene and anthracene derivatives, preparation and properties of napthalene, anthracene, naphthol, naphthylamine, naphthaquinone and anthraquinone.
Mechanism and orientation of electrophilic substitution reaction in naphthalene and naphthalene and anthracene.

Organic Compounds : Preparation, properties and synthetic uses of organo lithium and organo zinc compounds.

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 and 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 and III), S.M. Mukherji, S.P. Singh and R.P. Kapoor
7. Organic Chemistry(Hindi Ed.) : Suresh Ameta, P.B. Punjabi and B.K. Sharma, Himanshu Pub.

PAPER CODE-9447

PAPER III : PHYSICAL CHEMISTRY

UNIT I

Thermodynamics-I : Definition of thermodynamic terms system, surrounding, etc. types of systems, intensive and extensive properties, state and path functions, their differentials, thermodynamics process, concept of heat and work.

First law of Thermodynamics - Statement, definition of internal energy and enthalpy, heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law, Joule-Thomson coefficient and inversion temperature, calculation of w, q, dU and dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process.

Thermo chemistry : Standard state, standard enthalpy of formation. Hess's law of heat summation and its applications, Heat of reaction at constant pressure and at constant volume, Enthalpy of neutralization, bond dissociation energy and its calculation from thermo chemical data, temperature dependence of enthalpy, Kirchhoff's equation.

UNIT II

Thermodynamics - II : Second law of thermodynamics : need for the law, different statements of the law, Carnot cycle and its efficiency, Carnot theory, thermodynamic scale of temperature.

Concept of entropy : Entropy as a state function, Entropy as a function of V and T, entropy as a function of P and T. Entropy change in physical change. Clausius inequality, entropy as a criteria of spontaneity and equilibrium, entropy change in ideal gases and mixing of gases.

Third Law of Thermodynamics : Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz function, Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities. A & G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change, variation of G and A with P. Vand T.

Chemical Equilibrium : Equilibrium constant and free energy, thermodynamic derivation of law of mass action, distribution law and phase rule, Le Chatelier‟s principle, Nernst‟s distribution law for solute, principle of extraction of solute from solution and washing of precipitates.

Reaction isotherm and reaction isochore - Clapeyron equation and Clausius - Clapeyron equation, applications, partial molar quantities, partial molar volume and its distribution, chemical potential and its physical significance, Gibbs-Duhem equation.

UNIT III

Macromolecules : Nomenclature, classification, properties of polymer, mass of macro-molecules, number average and weight average molecular mass, determination of molecular weight by osmotic pressure. viscosity and light scattering and sedimentation (ultra centrifuge) methods.

Surface Chemistry : Sorption at surfaces, physical and chemical adsorption, Freundlich, Langmuir and Gibbs adsorption isotherms and their derivation, Streaming potential electrophoresis and electrosmosis.

UNIT IV

Phase Equilibrium : Statement and meaning of the terms - phase, component and degree of freedom, derivation of Gibb‟s phase rule, phase equilibrium of one component system- water CO_2 and S - system.

Phase equilibria of two component system - Solid - liquid equilibria, simple eutectic, Bi-Cd, Pb-Ag systems, desilverization of lead.

Solid solutions - Compound formation with congruent melting point (Mg - Zn) and incongruent melting point, (NaCl - H_2O), ($FeCl_3$ - H_2O) and ($CuSO_4$ - H_2O) systems, freezing mixtures, acetone - dry ice.

Liquid - liquid mixtures: Ideal liquid mixtures, Raoult‟s and Henry‟s law, Non -ideal system, azeotropes: HC1 - H_2O and ethanol - water systems.

Partially miscible liquids: phenol - water, trimethylamine - water, nicotine - water systems, lower and upper consolute temperature, effect of impurity on consulate temperature.

Immiscible liquids, steam distillation.

UNIT V

Electrochemistry : Types of reverse electrode : gas - metal ion, metal-metal ion, metal-insoluble salt - anion and redox electrodes, electrode reactions, Nernst - equation, derivation of cell E.M.F. and single electrode potential standard hydrogen electrode-reference electrodes - standard electrode potential sign conventions, electrochemical series and its significance electrolytic and Galvanic cells- reversible and irreversible cells, conventional representation of electrochemical cells. EMF of a cell and its measurements, computation of cell EMF. Calculation of thermodynamic quantities of cell reactions (AG, AH and K) polarization over potential and hydrogen over voltage. Concentration cell with or without transport, liquid junction potential application of concentration cells, valency of ions, solubility product and activity coefficient, potentiometric titrations.

Ionic Equilibria - Arrhenius theory of electrolyte and its application Ostwald‟s dilution law, its uses and limitations. Debye - Huckle theory of strong electrolytes, asymmetric electrophoretic. Debye- Falkenhagen and Wein effects, Activity coefficient, mean activity coefficient, ionic strength, Debye- Huckel limiting law.

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. A Text Book of Physical Chemistry : Kundu and Jain.
4. Physical Chemistry (Hindi Ed.) : Suresh Ameta, R.C. Khandelwal, R. Ameta and J. Vardia, Himanshu Pub.

PAPER CODE-9448

SECOND YEAR CHEMISTRY PRACTICALS 2017-18

Time : 5 Hrs (One day) **M.M. 75**

Distribution of Marks

	Exercises	Marks
1.	Volumetric Estimation OR Gravimetric Analysis	10
2.	Determination of R_1 values and identification of given organic compounds using thin layer/paper chromatography	7
3.	Identification of given organic compounds through functional group analysis	7
4.	Physical Chemistry Experiments	10
5.	Vice-voce	8
6	Records	8
	Total	50 marks

LIST OF EXPERIMENTS

1. **Volumetric Analysis** : Any one of the following exercise may be given in the examination :
   - (a) Determination of acetic acid in commercial vinegar using NaOH
   - (b) Determination of alkali content- antacid tablet using HC1.
   - (c) Estimation of calcium content in chalk as calcium oxalate using permanganate.
   - (d) Estimation of hardness of water by EDTA.
   - (e) Estimation of ferrous and ferric ions by dichromate methods.
   - (f) Estimation of copper using thiosulphate.
   - (g) Estimation of Mg_2, Ca_2 or 2÷complexometrically.

   Gravimetric Analysis :

   Analysis of Cu as CuSCN and Ni as Ni (dimethylgioxime)

   Note: ***Candidates are required to prepare standard solutions by proper weighing.***

2. **Thin Layer Chromatography :**

   Determination of Rf values and identification of organic compounds.
   - (a) Separation of green leaf pigments (spinach leaves may be used)
   - (b) Preparation and separation of 2,4 dinitrophenyihydrazones of acetone, 2- butanol, hexane-2-and 3-ones using toluene and light petroleum(40: 60)
   - (c) Separation of a mixture of dyes using cyclohexane and ethyl acetate (8.5:1.5)

Paper Chromatography: Determination of Rf values and identification of organic compounds in a mixture of amino acids / monosaccharides.

3. **Identification of Organic Compounds**:

   An organic compound from the following list be given for systematic identification:
   - (i) Carboxylic acids- Oxalic, Tartaric, Citric, Succinic, Benzoic, Cinnamic, Salicylic, Phthalic acids, Formic, Acetic, Propanoic and Butanoic acids.
   - (ii) Phenols- Phenol, Resorcinol, Hydroquinone, p-Cresol, α-Naphthol, β-Naphthol.
   - (iii) Alcohols- Methyl, Ethyl, Propyl, Isopropyl, n- butyl, isobutyl & tert. butyl alcohol.
   - (iv) Carbohydrates- Glucose, Fructose, Cane sugar and Starch.
   - (v) Aldehydes- Formaldehyde, Acetaldehyde and Benzaldenyde.
   - (vi) Ketones- Acetone, Methyl ethyl ketone, Acetophenone and Benzophenone.
   - (vii) Nitro compounds - Nitrobenzene, p-Nitrotoluefle and m- Dinitrobenzene.
   - (vii) Amino compounds - Aniline, o-, m-and p-toluidine, α- Naphthylamine and β-Naphthylamine.

(ix) Anilides - Acetanilide and Benzanilide.
(x) Amides - Acetamide, Benzamide and Urea.
(xi) Esters - methyl acetate, Ethyl acetate.
(xii) Thioamide - Thiourea.
(xiii) Hydrocarbons - Benzene, Toluene, Naphthalene and Anthracene.
(xiv) Halogen containing compounds - Chloroform, Chloral hydrate, Iodoform, Chlorobenzene, p-Dichorobenzeen and p-Dibromobenzene.

4. **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

Phase Equilibrium

(i) To study the effect of a solute (e.g. NaCl, succinic acid) on the critical solution temperature of two partially miscible liquids (e.g. Phenol water system) and to determine the concentration of that solute in the given phenol-water system.
(ii) To construct the phase diagram of two components (e.g. diphenylamine- benzophenone) system by cooling curve method.

Adsorption :

(i) To study the adsorption of acetic acid by activated charcoal and test the validity of Freundlichy or Langmuir adsorption isotherm.
(ii) To study the adsorption of oxalic acid by activated charcoal and test the validity of Freundlich or Langmuir adsorption isotherm.

Analysis of sugars:

1. Action of salivary amylase on starch
2. Effect of temperature on the action of salivary amylase on starch.
3. Differentiation between a reducing and a nonreducing sugar.

Virtual experiments (any two)

(i) Various type of titrations
(ii) Chromatographic separation of compounds from leaf or flower extract / dyes / amino acid / saccarides etc.
(iii) Some photochemical reactions
(iv) Isoelectric precipitation of proteins: casein from milk.
(v) Any other virtual experiment related to the content of syllabus and availability of the experimental facilities.

BOOKS RECOMMENDED

1. Practical Chemistry - Giri, Bajpai and Pandey, S. Chand & Co. Ltd., New Delhi.
2. Laboratory Manual in Organic Chemistry, R.K. Bansal, Willey Eastern.

3. Experimental Organic Chemistry, Vol. I and II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGrawHill.
4. Experiments in Physical Chemistry - J.C. Ghose, Bharti Bhawan.
5. Experiments in General Chemistry, N.r. Rado and U.C. Agarwal, Eastern Press.
6. Practical Chemistry - Suresh Ameta and P.b. Punjabi, Himanshu Publication.

SECOND YEAR B.SC. B.Ed COMPUTER SCIENCE

Paper-I :Introduction to Database Management System
Paper Code - 9460

UNIT - I

Introduction : Database system applications, What is database System, database systems versus file systems, views of data, database languages, database users , database system structure, Data Dictionary. Advantages of DBMS.

UNIT - II

Database Architecture and Modelling: DBMS Architecture(Internal ,Conceptual and External),Data Independence ,Database Models: Hierarchical ,Network and Relational , Role of DBA.

Data modeling using the Entity Relationship Model:ER model concepts, notation for ER diagram, mapping constraints, keys, concepts of super key, candidate key, primary key, unique key, generalization, aggregation, reduction of an ER diagram to tables.

UNIT - III

Relational DMBS : Terminology , views , Structure of relational databases, CODD'S Rules Relational algebra : Operators and Operands in relational algebra, Projection, Selection , Set union, Set difference, Set intersection , Cartesian product, Join , Natural join

UNIT - IV

Introduction to SQL : Characteristics of SQL, Advantages of SQL, Types of SQL commands, SQL operators and their precedence.Tables, Views and Indexes : Create, Alter , Insert , Drop Operations. Integrity Constraints.

Queries and sub-queries. Aggregate functions : Sum , Avg , Max , Min , Count.

SQL Functions : Arithmetic Functions , Character Functions , Date Functions.

UNIT - V

Backup and Recovery : Database backups, Hardware protection and redundancy , Importance of Backups. Database Recovery : Databse Recovery , Data Storage , Causes of Failures , Recovery Concepts and terminology..

Database Security and Integrity : Types of Integrity constraints , Restrictions on Integrity Constraints , Data Security Risks, Dimensions of Security. Protecting data within the database : Database audit , Authenticating users to the database, Statistical database , Data Encryption.

Recommended Books :

1. **Introduction to Database Systems :- Bipin Desai**

2. **Fundamental of database system :- Elmasiri and Navathe**

Paper- II : Object Oriented Programming using C++

Paper Code - 9461

UNIT – I

Different paradigms for problem solving, need for OOP, Differences between OOP and Procedure oriented programming, Advantages of OOP. Concept of Object Oriented Programming - Data hiding, Data Abstraction, Data encapsulation, Class and Object , Polymorphism , Inheritance.

Beginning with C++ : What is C++, Applications of C++ , Structure of C++ Program , C++ character set, Tokens , C++ Data types, Variables, A simple C++ Program. Comparing C with C++.

UNIT – II

Expressions and control structures : Operators in C++, Scope resolution operator, Member dereferencing operators, Memory Management operators, set manipulators, Expressions and implicit conversions.

Classes : Need for classes, Class definition, Class structure , Class objects, referencing Class members , scope of class and its members.

Functions in C++ : Function prototyping, Inline function, Constant member function ,Default arguments , function overloading, friend function.

UNIT - III

Classes and Objects : Array of objects , Arrays within class , Object as function arguments, function returning objects , Nesting of member function , Nesting of classes, Private member function, Friendly function.

Memory Allocation : Memory allocation of objects,Static data members, Static member functions, pointers to members , New and delete Operator ,This Pointer.

UNIT - IV

Constructor : Need for Constructors, Declaration and Definition , Default Constructors, Parameterized Constructors , copy Constructors, Order of constructor invocation , Dynamic initialization of Objects, Constructor overloading,Dynamic Constructors , Constructor with Default arguments , Constructing two - Dimensional Arrays , Special characteristics of Constructors.

Destructors : Need for Destructors , Declaration and Definition , Characteristics of Destructors.

UNIT - V

Inheritance : Need for Inheritance , Different forms of inheritance , Derived and base classes : single Inheritance , Multiple Inheritance , Multi level Inheritance , Hierarchical Inheritance and hybrid Classes.Visibility Modes ,Inheritance and Access control , Virtual Base Classes , Abstract Classes,

Constructors in Multiple Inheritance.

Virtual Functions and Polymorphism : Pointers to objects, Pointers to Derived Classes , Virtual Functions , Pure Virtual Functions.

Recommended Book :

1. **Object Oriented Programming with C++ :- E. Balaguruswamy**

Paper-III : Computer Organization

Paper Code - 9462

UNIT - I

Instruction codes : Introduction , Stored program organization , Indirect address, computer registers , common bus system.

Register transfer language , register transfer, Bus and memory transfer, Three state bus buffer. Arithmetic Micro operations, Logic micro operations, Shift micro operation. Binary Adder, Binary Incrementer , Arithmetic circuits.

UNIT -II

Computer instructions : Basic computer Instructions ,Instruction set completeness , Timing and Control. Instruction Cycle : Fetch and Decode, Type of instructions , Register- Reference Instructions, Memory - Reference Instructions , Input-Output Instructions. Interrupt Cycle.

UNIT - III

CPU : Introduction, General Register organization, control word,Example of micro operations , Stack Organization , register stack, memory stack , Instruction Formats : Three-address Instructions, Two-address Instructions ,one-address Instructions, Zero-address Instructions.

Addressing modes : Implied, Immediate , Register , Register Indirect ,Auto increment or Auto decrement , Direct Address , Indirect Address , Relative Address , Indexed Addressing ,Base Register Addressing Mode.

UNIT - IV

Asynchronous Data Transfer , Handshaking Asynchronous Serial Transfer, Modes of Transfer : DMA Transfer.

Main memory : RAM and ROM chips, Auxiliary Memory : Magnetic Disk , Associative Memory , Cache memory , Direct mapping Scheme.

UNIT - V

Microprocessor Architecture :Introduction to Microprocessor 8085 , ALU , Timing and Control Unit, Registers , Data and Address Bus.

Instruction Set of intel 8085 : Data Transfer Group , Arithmetic Group , Logic Group , branch control Group , Input/ Output and Machine Control Group.

Recommended Book :

1. **Computer Organisation :- Mano M.M.**
2. **Fundamentals of microprocessors and Microcomputers :- B.Ram**

PAPER - IV : PRACTICALS
Paper Code - 9463

NOTE : Students are required to perform all the experiments selecting one from each part.
MARKS DISTRIBUTION
PART - A : 20
PART - B : 20
PART -C (POWERPOINT REPRESNTATION) : 10
VIVA : 10
Two RECORDS (Topic covered Part-A & part-B) : 15

PART - A

Database Examples :
Simple Payroll Program.
Simple Library Management.
Simple Inventory Control Program.
Simple Student Profile Program.

1. SQL Queries Practical based on DDL Commands.
   Create, alter,drop.
2. SQL Queries Practical based on DML Commands.
   Select, update , delete ,Insert.
3. SQL Queries Practical based on DCL Commands.
   Grant, Revoke
4. SQL Queries Practical based on Boolean and comparisons operator related Commands.
5. SQL Queries Practical based on Arithmetic and Aggregate Functions.
6. SQL Queries Practical based on Nested sub queries,set membership, set comparisons , set cardinality.
7. SQL Queries Practical based on selective data from multiple databases.
8. SQL Queries Practical on Create views.
9. SQL Queries Practical based on Arithmetic Function.
10. SQL Queries Practical based on Character Function.
11. SQL Queries Practical based on Date Function.

PART - B

1. Write C++ Program using class and objects.
2. Write C++ Program using Scope resolution operator.
3. Write C++ Program using different types of operators in C++.
4. Write C++ Program using Function Prototype.
5. Write C++ Program using Function Overloading without class and objects.
6. Write C++ Program using Function Overloading using class.
7. Write C++ Program using Default arguments.
8. Write C++ Program using Friend function.
9. Write C++ Program using Inline Function.
10. Write C++ Program using Array of objects.
11. Write C++ Program using Array within class.
12. Write C++ Program using Objects as an Function arguments.
13. Write C++ Program using Function returning objects.
14. Write C++ Program using Nesting of Member Function.
15. Write C++ Program using Nesting of class.
16. Write C++ Program using Static data members.
17. Write C++ Program using Static Member Function.

18. Write C++ Program using New and delete operator.
19. Write C++ Program using Three types of Constructor.
20. Write C++ Program using Order of invocation of constructor and destructor.
21. Write C++ Program using CALL BY REFERENCE.
22. Write C++ Program using Single Inheritance.
23. Write C++ Program to create class hierarchy in which base class have multiple derived classes.
24. Write C++ Program to create class hierarchy in which derived class have multiple base classes.
25. Write C++ Program illustrating the use of abstract classes.
26. Write C++ Program illustrating the use of constructors in derived classes.
27. Write C++ Program using virtual base class.
28. Write C++ Program using pointers to derived classes.
29. Write C++ Program using virtual functions.
30. Write C++ Program using pure virtual functions.

PART - C

Power point presentation on the topics covered in Paper -I , Paper - II ,Paper -III as assigned by the concerned teacher.

SECOND YEAR T. D.C.SCIENCE, 2018-19

ZOOLOGY

The second 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-II (Vertebrates)	**50**
Paper-II : Genetics and Biotechnology	**50**
Paper-III :Applied Zoology and Microbiology	**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-9449

SECOND YEAR TDC SCIENCE, 2018-19

ZOOLOGY

PAPER-I : LIFE AND DIVERSITY OF ANIMALS-II (VERTEBRATES)

Duration : 3 hours **M.M. : 50**

UNIT-I

1 Characteristics and classification of Protochordates and Agnatha upto orders with examples emphasizing their biodiversity, economic importance and conservation.

2 Type study- *Herdmania.*

3 Affinities of *Amphioxus* and importance of Ammocoete larva.

UNIT-II

4 Characteristics and classification of Pisces (after Berg) and Amphibia upto orders with examples emphasizing their biodiversity, economic importance and conservation.

5 Type study- *Scoliodon,* Fish Migration, Parental care in Amphibian.

UNIT-III

6 Characteristics and classification of Reptiles upto orders with examples emphasizing their biodiversity, economic importance and conservation.

7 Type study- *Calotes.* Identification of poisonous and non-poisonous snakes, venom, antivenom, medicinal significance of venom.

8 *Sphenodon*: Characteristics and affinities.

UNIT-IV

9 Characteristics and classification of Aves upto orders with examples emphasizing their biodiversity economic importance and conservation.

10 Type study - *Columba,* flight adaptations, perching mechanism, types of feathers.

11 Bird migration.

UNIT-V

12 Characteristics and classification of Mammalia upto orders with examples emphasizing their biodiversity, economic importance and conservation.

13 Type study – *Rattus*, (Digestive, respiratory and urinogenital systems only).

14 Dentition, hair and thermoregulation; integumentary derivatives.

PAPER CODE-9450

SECOND YEAR TDC SCIENCE, 2018-19

ZOOLOGY

PAPER-II : GENETICS AND BIOTECHNOLOGY

Duration : 3 hours **M.M.: 50**

UNIT-I

1 Light and electron microscope structure of chromosome (from nucleosome to organization of chromatids. Morphological classification of chromosome).

2 Extra-chromosomal inheritance.

3 Chromosomal theory of sex determination, hormonal theory of sex determination, X and Y chromosomes, gynandromorphs.

UNIT-II

4 Brief history of genetics, mendelian laws and their significance.

5 Linkage and crossing over : kinds of linkage – complete and incomplete linkage, linkage groups, significance of linkage.

6 Genetic interaction: Complimentary gene, duplicate genes,supplementary gene and epistasis.

7 Multiple-gene inheritance, ABO blood group, Rh factor.

UNIT-III

8 Concept of gene, mucon, recon,cistron, gene expression -lac-operon and trip-operon.

9 Genetic engineering: Restriction enzymes, Palindrome sequences, cloning vehicle, C-DNA.

10 Applications of genetic engineering. Hybridoma technology.

UNIT-IV

11 Mutations: Definition, gene mutation, chromosomal mutation, chromosomal aberrations, somatic and germ mutations, numerical alterations of chromosomes, molecular basis of mutation, mutagenic agents

12 Polytene and lamp-brush chromosomes.

13 Eugenics and genetic counselling.

UNIT-V

14 Medicines and biotechnology: Microbes in medicine, antibiotics, vaccines, enzymes and antigens.

15 Food and dairy microbiology: Fermented food production, dairy products, food preservation, microbial spoilage, alcoholic beverages, and vinegar.

16 Role of Biotechnology in health care.

PAPER CODE-9451

SECOND YEAR TDC SCIENCE, 2018-19

ZOOLOGY

PAPER-III : APPLIED ZOOLOGY AND MICROBIOLOGY

Duration: 3 hours **M.M.: 50**

UNIT - I

1 History, general account and scope of sericulture. Distribution of mulberry and non-mulberry silkworm.

2 Life history of *Bombyx mori*.

3 Rearing techniques of silkworm

(a) Brief account of environmental conditions of rearing and programming of mulberry cultivation.

(b) Rearing of silk worm.

4 Reeling of silk yarn.

5 Brief idea of diseases of silk worm.

UNIT-II

6 History, scope and general practices of pearl culture.

7 Rearing of pearl oyster:

(a) Indigenous methods of pearl culture.

(b) Modern methods of pearl culture.

8 Economic Importance of pearl and pearl culture.

9 Brief idea of diseases and enemies of pearl culture.

UNIT-III

10 Fin-fish culture and fisheries:

(a) Culturable fresh water fishes of India.

(b) Inland, marine and estuarine fisheries.

(c) Preservation of fishes.

(d) Economic importance of fishing industry.

UNIT-IV

11 Concepts of basic microbiology and its significance, theory of spontaneous generation, gram theory of fermentation and disease, work of Louis Pasteur.

12 General account of classification, structural organization, physiology and multiplication of bacteria.

13 General account of classification, structural organization, physiology and multiplication of bacteria.

14 Brief idea of Industrial, Medical and Environmental microbiology.

UNIT-V

15 DNA and RNA viruses

16 **AIDS:** Causative agents, Transmission, Pathogenicity, Prevention and Laboratory diagnosis of infections and treatment

PAPER CODE-9452

SECOND YEAR TDC SCIENCE, 2018-19

ZOOLOGY - PRACTICAL

Duration : 5 Hrs. **M.M. :50**

S.No.	Exercise	
1	Major dissection	10
2	Minor dissection/	05
3	Mounting/Applied Zoology exercise	04
4	Spots	15
5	Viva-voce	8
6	Record	8
	Total :-	**50**

Major Dissection marks will be given only if virtual dissection is available otherwise marks may be given according to availability of dissection alternate.

General survey of Vertebrates (Museum specimens)

A Urochordata : *Ciona, Pyrosoma, Doliolum, Salpa,*

B Cephalochordata : *Amphioxus*

C Agnatha : *Petromyzon*, Ammocoete larva

D	Pisces	:	*Echeneis, Sphyrna, Torpedo, Pristis, Labeo, Clarias, Anabas, Hippocampus* (male and female), *Chimaera, Anguilla, Protopterus.*
E	Amphibia	:	*Ichthyophis, Axolotl* larva, *Salamander, Bufo, Rana, Hyla, Pipa, Amphiuma, Alytes.*
F	Reptilia	:	*Testudo, Trionyx, Hemidactylus, Draco, Calotes, Chamaeleon, Varanus, Phrynosoma, Heloderma, Naja, Vipera, Typhlops, Bungarus, Hydrophis, Eryx,* models of Dinosaurs.
G	Aves	:	*Columba, Psittacula, Passer, Bubo,* model of *Archaeopteryx*
H	Mammalia	:	*Pteropus, Rhinopoma, Felis, Erinaceous, Hystrix Crocedura, Manis.*

PREPARED SLIDES :

1	Cephalochordata	:	*Amphioxus*: T.S. through buccal region, T.S. through pharynx showing gonads, T.S. through caudal region.
2	Pisces	:	Placoid, cycloid and Ctenoid scales, V.S. of skin.
3	Amphibia	:	V.S. of skin, T.S. of testis, T.S. of kidney and T.S. of liver.
4	Reptilia	:	V.S. of skin and T.S. of stomach.
5	Aves	:	T.S. of intestine, T.S. of liver, T.S. of ovary, filoplume W.M.
6	Mammalia	:	T.S. of pancreas, T.S. of thyroid gland, L.S. of pituitary gland, T.S. of stomach, T.S. of intestine, L.S. of kidney, T.S. of testis and ovary and V.S. of skin, T.S. of lung.

PERMANENT PREPARATIONS: Unstained placoid scales, spicules of *Herdmania.*

DISSECTION (Virtual): Virtual dissection will be done (if facility of virtual is made available by University

Herdmania	:	Neural complex.
Scoliodon	:	Alimentary canal, scroll valve *in situ*, afferent and efferent branchial arteries, eye muscles, internal ear.
Digital animals	:	Arterial, venous and urino-genital systems.

OSTEOLOGY :

Identification of disarticulated skeleton of *Rana*, *Varanus, Gallus* and *Oryctolagus*. Palates of birds.

GENETICS:

Drosophila : Life cycle and its culture. Identification of wild and mutant *Drosophila.*

APPLIED ZOOLOGY:

1 Identification of different stages (from egg to adult) of silkworm.

2 Tools used in silk worm rearing.

3 Mounting of mouth parts and sting apparatus of honey bee.

4 Identification of cultivable varieties of shell fish and fin fish.

5 Gram staining of microbes.

- The teacher concerned will provide e-materials to practical in the form of video or demonstrations or written materials including dissections.

REFERENCE BOOKS (LATEST EDITIONS):

LIFE AND DIVERSITY OF ANIMALS (VERTEBRATES)

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

2 Jordan, E.L. and P.S.Verma, Chordate Zoology and Elements of Animal Physiology, S. Chand & Co. Ltd., Ram Nagar, New Delhi (English and Hindi Editions).

3 Parker and Haswell, Text Book of Zoology, Vol.II (Chordata), A.Z.T.B.S. Publishers and Distributors, New Delhi- 110051.

4 Waterman, Allyn J. et.al., Chordate Structure and Function, Mac Millan and Co., New York.

5 Kotpal, RL, Modern Text Book of Zoology- Vertebrates, Rastogi Publications, Meerut (English and Hindi Editions).

6 Ganguly, BB, Sinha, AK and Adhikari, S : Biology of Animals, Vol.II, New Central Book Agency (P) Ltd. Kolkatta.

7 Alexander, R.M.: The Chordates (Cambridge University Press).

8 Monielth, A.R: The Chordates (Cambridge University Press).

9 Young, J.Z : Life of Vertebrates (Oxford University PressL)

10 Waterman, A.J: Chrodata - Structure and Function (Macmillan Co.).

GENETICS AND BIOTECHNOLOGY:

11 Verma, P.S. and V.K.Agarwal, Genetics, S.Chand & Co.

12 Lewis, C.D. and Lewin, R., Biology of Gene, McGraw Hill, Toppan Co. Ltd.

13 Gunther S. Stent, Molecular Genetics, macmillan Publishing Co. Inc.

14 Goodenough, V., Genetics, New York Holt, Rinchart and Winston.

15 Gardner, Principles of Genetics, Wiley Eastern Pvt., Ltd.

16 Winchester, Genetics, Oxford IBH Publications

17 Stickberger, Genetics, MacMillan Publications.

18 Pai, A.C., Foundations of Genetics, McGraw Hill Publications.

19 R.A.Meyers (Endocrinology.): Molecular Biology and Biotechnology, VCH Publishers.

20 Glick : Molecular Biotechnology.

21 R.W.Old and S.B. Primrose: Principles of Gene Manipulation and Introduction to Genetic Engineering.

22 Gupta PK : Elements of Biotechnology, Rastogi Publications, Meerut.

APPLIED ZOOLOGY AND MICROBIOLOGY :

23 Jhingran, VG, Fish and Fisheries of India. Hindustan Publishing Corporation, New Delhi.

24 Kovaleve, PA, Silkworm Breeding Stocks, Central Silk Board, Merine Drive, Bombay.

25 Roger, A. Morse, The ABC and XYZ of Bee Culture, A.I. Root and Co., Medina, Ohio 44256.

26 Metcalf CL and WP Flint, Destructive and Useful Insects, Tata McGraw Hill publishing Co. Ltd., New Delhi- 110051

27 Sharma PD, Microbiology, Rastogi Publications Meerut.

28 Shukla and Upadhyaya : Economic Zoology (Rastogi Publishers)

29 Venkitaraman : Economic Zoology (Sudarshana Publishers)

PRACTICAL:

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

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

SECOND YEAR SCIENCE

BOTANY

Papers	No. of Papers	No. of Periods per week	Maxi-mum Marks	Min. pass Marks
Paper I	**3**	**3**	**50**	
Paper II	**3**	**3**	**50**	**54**
Paper III	**3**	**3**	**50**	
PRACTICALS	**6**	**5**	**50**	**27**

There shall be three written papers of three hours duration each. The candidates will be required to pass in theory and practical examinations separately.

THEORY

Paper I : Taxonomy and Embryology of

Angiosperms	50
Paper II : Anatomy of Angiosperms, Economic Botany and Ethnobotany.	50
Paper-III: Cytogenetics, Plant Breeding, Evolution and Biostatistics.	50
PRACTICALS :	
Duration of each Theory Paper	3 hours
Duration of Practicals	5 hours

(in one day)

PAPER CODE-9453

PAPER-I

TAXONOMY AND EMBRYOLOGY OF ANGIOSPERMS

Unit-1

Taxonomic categories; concept of species, genus and family; Herbarium techniques. Systems of classifi-cation of Bentham and Hooker, Engler and Prantl, Hutchinson and Takhtajan.

Unit-2

International rules of nomenclature, range of floral structure, floral variation, and economic importance of Ranunculaceae, Brassicaceae, Papaveraceae, Capparidaceae, Caryophyllaceae, Malvaceae, Ruta-ceae, Cucurbitaceae, Myrtaceae, Leguminosae, Rosa-ceae, Apiaceae (Umbelliferae).

Unit-3

Range of floral structure, floral variation and economic importance of Rubiaceae, Asteraceae, Primulaceae, Solanaceae, Asclepiadaceae, Convolvulaceae, Apocy-naceae, Acanthaceae, Lamiaceae, (Labiatae), Euphor-biaceae, Poaceae(Graminae).

Unit-4

Classical theory of morphology of flower; Primitive stamens and carpel; Microsporogenesis, Megasporo-genesis, Structure and development and male and female gametophytes, Fertilization, Nutrition of Embryo sac.

Unit-5

Structure, development and types of endosperm and embryo, Polyembryony, Apomixis, Experimental embryology; Culture of anther, endosperm and embryo.

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-9454

PAPER II

ANATOMY OF ANGIOSPERMS, ECONOMIC BOTANY AND ETHNOBOTANY

Unit-1

Plant anatomy : Introduction, organization of meri-stems; theories related to their organization; cell wall gross microscopic structure and chemistry.

Unit-2

Tissue and tissue systems; Parenchyma, Collenchyma, Sclerenchyma, Xylem, Phloem, Secretory structures and periderm.

Unit-3

Primary and Secondary Structure : Structure of root, stem and leaf. Primary and secondary anomalous structure with special reference to *Aristolochia, Salva-dora, Bignonia, Achyranthes, Amaranthus, Boerhaavia, Mirabilis, Chenopodium Dracaena, Tinospora.*

Unit-4

Study the economic botany of the following :

Cereals	:	*Triticum, Zea*
Pulses	:	*Glycine max, Cajanus cajan*
Fibres	:	Classification; *Gossypium, Crotalaria, Corchorus;* artificial fibres.
Wood	:	Classification, mechanical properties; *Shorea, Tectona, Pinus, Cedrus.*
Paper	:	Raw materials and manufacture.
Sugar	:	Sugarcane, Beet.

Unit-5

Study of economic uses of the following :

Medicinal Plants	:	*Rauwolfia, Datura, Cinchona, Papaver.*
Beverages	:	Alcoholic; Non-alcoholic: tea and coffee.
Spices and Condiments	:	*Coriandrum, Cuminum, Ferula, Curcuma, Trigonella, Elettaria, Capsicum, Piper, Zingiber.*
Oil	:	*Arachis, Cocos, Helianthus*.
Ethnobotany	:	Introduction; Aims and Objectives; knowledge of important plants of various groups from Ethnobotanical point of view as food, fodder and Medicine with special reference to Rajasthan.

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-9455

PAPER-III

CYTOGENETICS, PLANT BREEDING,

EVOLUTION AND BIOSTATISTICS

Unit-1

Cell Biology - Structure of cell (of both prokaryotes and eukaryotes); membranes; cell organelles, ergastic substances. Chromatin- euchromatin, heterochro-matin. Chromosomes - Type and organization; morpho-logy, chemical constituents; Structural changes in chromosomes and their significance.

Unit-2

Cell Division - Amitosis, mitosis, meiosis; synepto-nemal complex; Linkage and crossing over. Gene (Chromosomal) mappping; Sex determination.

Unit-3

Mendel‟s laws of inheritance - Monohybrid and dihy-brid ratio, incomplete dominance; Modifications of dihybrid ratio; cytoplasmic inheritance (Inheritance of plastids and streptomycin resistance in *Chlamy-domonas*); Principles of plant breeding. Selection, introduction, clonal propagation, hybridization, mutation breeding.

Unit-4

Green Revolution, conservation of germplasm, centres of origin. Cytology in relation to taxonomy; Apomixis; Polyploidy; Breeding work on wheat.

Unit-5

Evolutionary theories, catastrophism, the Lamarck‟s theory, development of Darwin‟s theory, Evidences of evolution, adaptations, natural selection patterns of evolution, origin of species. Elementary study of bio-statistics; mean, mode, median, standard deviation.

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-9456

PRACTICALS

The practical exercises have been divided into following two groups:

Group-I : Taxonomy, Embryology and Economic Botany.

Group-II : Anatomy, Cytology and Statistics.

GROUP-I

(A) TAXONOMY

1. Ranunculaceae : *Ranunculus, Nigella, Delphinium*
2. Brassicaceae : *Brassica, Raphanus, Iberis*
3. Papaveraceae : *Argemone, Papaver.*
4. Capparidaceae : *Capparis, Cleome.*
5. Caryophyllaceae : *Stellaria, Spergula, Viscaria, Dianthus* (Single)*, Gypsophylla.*
6. Malvaceae : *Hibiscus, Althaea*
7. Rutaceae : *Citrus, Ruta, Murraya*
8. Leguminosae : *Pisum, Crotalaria; Cassia, Caesalpinia, Bauhinia, Tamarindus; Acacia, Prosopis, Mimosa.*
9. Myrtaceae : *Callistemon, Eucalyptus*

10. Cucurbitaceae : *Citrullus, Cucumis*
11. Apiaceae : *Coriandrum, Foeniculum*
12. Rubiaceae : *Hamelia*
13. Asteraceae : *Helianthus, Tridax, Launaea, Ageratum.*
14. Primulaceae : *Anagallis.*
15. Apocynceae : *Catharanthus, Nerium, Thevetia.*
16. Asclepiadaceae : *Calotropis, Leptadaenia, Cryptostegia*
17. Solanaceae : *Solanum, Nicotiana, Petunia.*

18. Acanthaceae : *Barleria, Adhatoda, Justicia, Peristrophe.*

19. Lamiaceae : *Ocimum, Salvia*

20. Euphorbiaceae : *Euphorbia, Ricinus*

21 Poaceae : *Triticum.*

The above list of plants is only suggestive and can be replaced depending on local availability.

(B) EMBRYOLOGY SLIDES :

1. Placentation : Types

2. Ovules : Types

(1) T.S. Anther

10. L.S. Mature Seed : Maize/Gram/Pea

11. L.S. bud with anther and gynoecium.

12. Pollinium whole mount.

13. V.S. Cyathium.

14. V.S. *Ficus* inflorescence.

(C) ECONOMIC BOTANY AND ETHNOBOTANY

All plants as prescribed in theory paper.

GROUP-II

(A) ANATOMY

1. Stem : *Boerhaavia, Achyranthes, Bignonia, Chenopodium, Leptadaenia, Nyctanthes, Salvadora, Dracaena, Triticum, Mirabilis, Aristolochia, Amaranthus, Chenopodium.*

2. Root : *Tinospora, Ficus.*

(B) CYTOLOGY

Smear preparation of root tips and onion bud for different stages of mitosis and meiosis.

(C) STATISTICS

Mean, Mode, Median, Standard Deviation. Monohybrid and Dihybrid crosses and test cross.

(D) EMASCULATION

MARKING SCHEME

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

	Students	
	Regular	**Ex**
(a) An angiosperm material for anato-mical study with (i) double stained, labelled cellular sector diagram, identification and (iv) special (anatomical/ecological) character (2.5 marks each (i) to (iv).	10	13
2. Economic/ Ethnobotany.	5	6
Description in semi-technical language of given twig, (i) with diagrams, (ii) description and (iii) identification with characters.	12	14
4. Embryology	05	05
5. Smear preparation for two stages of cell division.	05	05
6. Genetic exercise Or Emasculation technique.	05	06
7. Statistical exercise.	05	06
8. Spots five (At least one from each		

	paper)	10	10
9.	Viva-voce	10	10
10.	Records and collection.	08	-
	Total	**75**	**75**

BOOKS SUGGESTED

Bhojwani, S.S. and Bhatnagar, S.P.: The Embryology of Angiosperms, Vikas Publishing House, Delhi, 1974.

Dutta, S.C.: Hand Book of Systematic Botany, Asia Publishing House, Bombay, 1979.

Gupta, P.K.: Cytology, Genetics and Evolution, Rastogi Publications.

Hill, A.H.: Economic Botany, McGraw Hill Book Co., 1952.

Mitra, J.N. : Elements of Systematic Botany of Angiosperms and Plant Ecology, The World Press Pvt. Ltd., Calcutta, 1977. Vikas Publishing House, Delhi.

Pandey, B.P.: Economic Botany, S. Chand And Co.Pvt. Ltd., 1988.

Tiagi, Y.D. and Kshetrapal, S. : An Introduction to Taxonomy of Angiosperms. Ramesh Book Depot, Jaipur, 1974.

P.K. Gupta : Genetics.

Sinha, U. and Sinha: Cytogenetics, Plant Breeding and Evolution.

Shukla and Chandel: Cytogenetics and Plant Breeding.

Choudhary, H.K. Elementary Principles of Plant Breeding.

PAPER CODE-9457

SECOND YEAR B. Sc. MATHEMATICS 2016-17

PAPER – I

ADVANCED CALCULUS

Duration: 3 Hours **Max. Marks: 50**

UNIT -I

Continuity: Cauchy definition of continuity of a function of one variable, Notion of limit and continuity of function of two variable (Not Theorems), discontinuous functions and their kinds, Properties of continuous functions at a point and in closed intervals.

Derivability: Differentiable functions and their properties including Darboux theorem, Examples of continuous and differentiable functions.

UNIT - II

Partial differentiations, envelopes and evolutes, Maxima and Minima of two variables and more than two variables including Lagrange's method of undetermined multipliers.

UNIT -III

Evaluation of double and triple integrals, Dirichlet's theorem and Liouville's extension, change of order of integration and volume and surface of solid of revolution.

UNIT - IV

Jacobians, change of independent variables. Vector Calculus: Direction of derivatives, gradient of scalar functions, irrotational Vectors, definition of gradient, divergence of a vector, curl of a vector, curl of the product of a scalar and vector, divergence of a vector product.

UNIT - V

Vector Integration: Gauss's theorem, divergence of the product of a scalar and a vector, Stoke's theorem, surface integral of the curl of a vector, Green's theorem (Excluding the proofs of the theorems)

References:

1. Gorakh Prasad : Differential calculus, Pothishala Pvt. Ltd., Allahabad
2. Gorakh Prasad : Integral calculus, Pothishala Pvt. Ltd., Allahabad.
3. Malik, S.C. : Mathematical Analysis, Wiley Eastern Ltd., New Del
4. Shanti Narayan : A Course of Mathematical Analysis, S. Chand and Company, New Delhi.
5. Jain, P.K. and : An Introduction to Real Analysis by, S. Chand and Company, New Delhi.
6. Kaushik, S.K. : Principles of Mathematical Analysis.

7. Walter Rudin : A first course in Real Analysis.

8. Sharma Purohit : Elements of Real Analysis.

9. Bhargava, Goyal : Real Analysis.

10. Sharma, Gokhroo : Real Analysis.

11. Spain, B. : Vector Analysis.

12. Bhargava, Banwari Lal : Sadish Kalan.

13. Gokhroo, Saini : Sadish Kalan.

PAPER CODE-9458

SECOND YEAR B. Sc. MATHEMATICS 2016-17

PAPER – II

DIFFERENTIAL EQUATIONS

Duration: 3 Hours **Max. Marks: 75**

UNIT - I

Exact differential equations and equations of special forms. Simultaneous differential equations. Total differential equations.

UNIT – II

Linear differential equations of second order and their solutions by:

(i) The method of finding an integral of the C.F. by Inspection,

(ii) Changing of independent variables,

(iii) Removal of the first derivative,

(iv) Operational factors,

(v) Undetermined coefficients and

(vi) Variation of parameters.

UNIT - III

Linear partial differential equations of first order: Lagrange's method, Integral surfaces passing through a given curve, orthogonal surfaces, Geometric description of Pp+Qq=R. Non-Linear partial differential equations of order one. Special methods of their solutions applicable to certain standard forms.

UNIT -IV

Charpit's method of solving non linear partial differential equations of first order, Monge's method of integration of equations Rr + Ss + Tt = V. Higher order homogeneous linear part of differential equation of the first order.

UNIT - V

Numerical solutions of ordinary differential equations: Introduction about initial value problem, boundary value problem, Euler's method, short comings. Euler's modified method. Picard's method of successive approximation and Picard's method for simultaneous equations.

References:

1. Ray and Sharma : Differential equation.
2. Bansal, Dhami : Differential equation (Vol. II).
3. Raisinghania, M.D. : Advanced differential equations.
4. Murray A. Daniel : Differential equation.
5. Forsyth, A.R. : A Treatise on Differential equation.
6. Ian N. Sneddon : Elements of Partial differential equations., Mc Graw–Hill Book Company.
7. Gokhroo, Saini, Kumbhat : Avkal Samikaran.
8. Gokhroo, Saini, Ojha : Partial differential equations.
9. Codington, E.A. : An introduction to ordinary differential equation by, Prenticehall of India.

SECOND YEAR B. Sc. MATHEMATICS 2016-17

PAPER – III

MECHANICS

Duration: 3 Hours **Max. Marks: 75**

UNIT – I

Equilibrium of bodies under three or more forces, Friction, common category.

UNIT –II

Virtual work, Projectile on inclined plane and Impact.

UNIT – III

Velocity and Accelerations (Tangential, normal, radial, transversal), Rectilinear motion, Hooke's law and motion of horizontal and vertical strings.

UNIT –IV

Constrained motion (circular and cycloidal), motion under resisting medium (resistance varies as velocity and square of velocity).

UNIT –V

Fluid pressure and thrust on immersed plane surfaces. Center of pressure.

References:

1. S. L. Loney : Statics, Macmillan and Company,London.
2. R.S. Verma : A Text book of Statics (Pothishala)
3. Ray & Sharma : A Text book of Hydrostatics
4. N.Sharma : A Text book of Dynamics.
5. M Ray : A Text book of Dynamics.

6. Bhargava & Agrawal : Gati Vigyan

7. Gokhroo, Saini : Uchch Gati Vigyan

8. Gokhroo & Others : Hydrostatics(Hindi Ed.)

9. Gokhroo & Others : Statics (Hindi Ed.)

10. Bhargava & Others : Hydrostatics (Hindi Ed.)

11. Bhargava & Others : Statics (Hindi Ed.)

THIRD YEAR

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**

PAPER CODE-9571

ASSESSMENT FOR LEARNING

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

1. Understand the historical aspect and current practices of Assessment.
2. Understand assessing children"s progress in terms of psychological development and the criteria provided by the curriculum.
3. Explain cognizant of key concept related to assessment such as measurement, evaluation, assessment, Examination, Test, Formative and Summative evaluation etc.
4. Evolve realistic, comprehensive and dynamic assessment procedures that are able to keep the whole students in view.
5. Explore the use of wide range of assessment tool their selection and appropriate construction.
6. Develop critical understanding of issues in assessment for learning (from constructivist paradigm)
7. Use statistical techniques for interpretation of assessment data.
8. Understanding the critical role of assessment in enhancing learning.
9. Design, integrate and evaluate appropriate assessment tools as part of the learning process.
10. Develop assessment linked to student learning outcomes.
11. Understand and use assessment for improvement of teaching and learning.

COURSE CONTENT

UNIT- I Overview concept of assessment

1. Concept and purpose of assessment
2. Perspective on assessment and evaluation for learning in a constructivist paradigm.
3. Clarification of the terms
   a) Assessment, evaluation, test, examination, measurement
   b) Formative and summative assessment
   c) Continuous and comprehensive assessment
   d) Grading
4. Distinction between terms
   a) Assessment for learning
   b) Assessment as learning
   c) Assessment of learning
5. principles of assessment for learning
6. Critical review of current evaluation practices and their assumption about learning and development.

UNIT- II Assessment of Subject based learning

1. Enlarging notions of subject based learning in a constructivist perspective.
2. Assessment tools
   a) Kinds of task : project, assignments & performance
   b) Observation of learning process by
   c) Self
   d) Peers
   e) Teachers
   f) Self and peer assessment
3. Assessment technique: Oral, Practical test, CAA(Computer Aided Assessment), Test, Exercise, Portfolio, Assignment, MCQ, Short Answer, Notes, Summary, Observing, interviewing and writing comprehensive profile of a student.

UNIT- III Context of assessment and evaluation

1. Context of assessment: subject related, person related.
2. Steps in pedagogical analysis of content matter.
3. Preparation of test items, development of blue print.
4. Checking of answer script: subjective and objective.
5. Classification of assessment based on
   a) Purpose: prognostic, diagnostic, formative, summative
   b) Scope: teacher made, standardized
   c) Attribute: achievement, attitude, aptitude, interest, personality, intelligence, creativity.
   d) Information: qualitative, quantitative
   e) Response: oral, written

UNIT- IV Data analysis & feedback

1. Importance and use of educational statistics.
2. Statistical tools-frequency distribution, normal distribution, graphical representation, percentile, central tendency, deviation, rank difference and product moment coefficient of correlation and their interpretation.
3. Meaning and purpose of feed back in teaching learning process.
4. Types of teacher feedback (written, comments, oral, peer feed back)
5. Reporting on a learner profile in consolidated form .
6. Use of assessment for feedback and taking pedagogic decision.

UNIT V Reforms in assessment for learning

1. Critical analysis of prevalent practices of assessment .
2. Commercialization of assessment i.e. tuition, coaching, study center etc.
3. Assessment for social selection and placement.
4. NCF-2005 & NCFTE-2009 on assessment reforms.
5. Improving quality and range of question in examination paper.
6. Role of ICT in Assessment.
7. De linking of school based assessment from examination: some possibilities and alternative practices.
8. Innovation in assessment practices.

SESSIONAL WORK

(Any two of following)

1. A critical analysis of a question paper in any subject of RBSE/CBSE.
2. Prepare a diagnostic test and remedial programme of any subject at secondary level.
3. Organize a group activity (like: competition, story telling, reading, writing), evolve criteria for assessing the activity and present an assessment report of the activity.
4. School visits followed by presentation of a report on evaluation practices in school.
5. Construction, administration and interpretation of self made achievement test.

REFERENCES

1. A.J. (2001). Educatuinal Assessment for Student (3rd Ed.) Upper Saddle River , NJ: Prentice Hall.
2. Agarwal, Y.P.,(1990) Statistical Method: Concept, Application and Computation, Sterling Publisher Pvt. Ltd. New Delhi.
3. Angelo, Thomas A. and Patricia Cross. (1993). Classroom Assessment Techniques: A Handbook for College Teachers. (2nd edition). San Francisco: Jossey-Bass.
4. Banta, Trudy W. et al. (1996) Assessment in Practice: Putting Principles to Work on CollegeCampuses. San Francisco: Jossey-Bass.
5. Battersby, Mark. (1999) “So What is a Learning Outcome Anyway?” Vancouver, B.C.: Learning Outcomes Network; Centre for Curriculum, Transfer and Technology.
6. Becker, H.J., & Reil, M.M. (2000), Teacher professional engagement and constructivist compatible computer use (Report No. 7). Irvine, CA: Center for Research on information Technology and organization.

7. Black, P. & Wiliam, D (1998). Assessment and Classroom Learning. Assessment in Education 5(1) pp. 7–71.
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9. Black, P.J. & Wiliam, D. (1998) Inside the Black Box: Raising standards through classroom assessment. King"s College, London.
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12. Burke, K., Fogarty, R., & Belgrad, S (2002) : The Portfolio connection: Student Work Linked to standard (2nd Ed.) Thousand Oaks, CA: Corwin.
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14. Chouhan, S.S., (1990): Innovation in Teaching Learning Process, Vikas Publication, New Delhi.
15. Cooper, Damian. (2006). Talk About Assessment: Strategies and Tools to Improve Learning. Toronto, ON: Thomson Nelson. Government of British Columbia [7]
16. Danielson, C. (2002). Enhancing student Achievement: Framework for school improvement.
17. Ecclestone, Kathryn (2010). Transforming formative assessment in life long learning. McGraw Hill. Eng.
18. Gentile, J.R. & Lalley, J.P. (2003) :Standards and Mastery Learning :Aligning teaching and assessment so all children can learn. Thousand Oaks, CA: Corwin.
19. Goodman, J. (2012). Improving progress through AfL. Dr Joanna Goodman reflects on the role and application of Assessment for Learning. *SecEd*, 304:13.
20. Grasha, Tony. (1996) Teaching with Style: A Practical Guide to Enhancing Learning by Understanding Teaching and Learning Styles. Pittsburgh, PA: Alliance Publishers.
21. Guskey, T.R., & Bailey, J.M. (2001). Developing Grading and reporting system for student learning. Thousand Oaks, CA: Corwin.
22. Manitoba Education, Citizenship, and Youth. (2006) Rethinking Assessment with Purpose in Mind: assessment for learning, assessment as learning, assessment of learning Winnipeg, Manitoba, Canada: MECY [8]
23. Natrajan, V. and Kulshreshta, S.P. (1983). Assessment non- Scholastic Aspects –Learner Behaviour, New Delhi: Association of Indian University.

24. NCERT (1985),. Curriculum and Evaluation, New Delhi,: NCERT Newman, F.M. (1996). Authentic Achievement: Restructuring School for Intellectual quality. San Francisco, CA: Jossey- Bass. Nitko.
25. Norris N.(1990) Understanding Educational Evaluation, Kogan Page Ltd. Singh H.S. (1974) Modern Educational Testing. New Delhi: Sterling Publication.
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27. Savery, J. and Duffy , Thomas M.(1995) Problem based learning: An Instructional Model and its constructivist framework. Educational Technology, 35, 31-38, 21.
28. Singh, H.S.(1974). Modern Educational Testing, New Delhi : Sterling Publication.
29. Stiehl, Ruth. (2000) The Outcomes Primer: Reconstructing the College Curriculum. Corvallis, OR: The Learning Organization.
30. Stiggins, Richard J. Opening Doors to Excellence in Assessment, A Guide for Using QualityAssessment to Promote Effective Instruction and Student Success, Assessment Training Institute, Inc. Portland, OR: July 1996.
31. Throndike, R.L. and Hagan (1977). Measurement and Evaluation in Psychology and Education.
32. Verma Ramesh, Suresh K. Sharma (1990) : Modern Trends in Teaching Technology, Anmol Publication Pvt. Ltd. New Delhi.
33. Wiggins, Grant. (1998). Educative Assessment: Designing Assessments to Inform and Improve Student Performance. San Francisco: Jossey-Bass.

Websites link

- http://www.aahe.org/assessment/assess_links.htm
  A hefty site updated by the American Association of Higher Education. Has many links to assessment articles, sites and listserves.
- http://www.duq.edu/~tomei/tomei/advancedsites.html
  Another hefty site that includes many links to articles and sites on assessment, Bloom"s taxonomy, learning styles, etc.
- http://www.snow.utoronto.ca/Learn2/introll.html
  Learning to Learn, a thinking and learning skills site, is for learners, teachers, and researchers to learn about the value of self-awareness as a critical part of learning. It was created for educators developing their assessment and instructional design skills.
- http://www.ldcommunity.org/thesystem.html
  Learning Disabilities Resource Community (LDRC) site that focuses on teaching and assessment including the Intelligent Tutoring and Assessment System that plans to focus on the navigational tools available to users, including perceptual modes.

- http://www.sbctc.ctc.edu/Board/Educ/Outcomes/outcom_wag.htm
  Washington State Assessment Newsletter
- http://www.wwu.edu/~assess/airlinks.htm
  A site generated by Western Washington University that includes resources, articles and
- links to assessment sites.
- http://trgmcber.haygroup.com/Products/learning/lsius.htm
  An online version of David Kolb"s Learning-Style Inventory. Material is not printable, but one can opt to pay for it, take it online or order copies for class use.
- http://www.keirsey.com/
  Links to Meyers Briggs information sites
- http://pss.uvm.edu/pss162/learning_styles.html
- http://www.hcc.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/
- http//www. snow.utoronto.ca/Learn 2/mod3/ tchstyle.html for a Multiple Intelligence Inventory, Thinking Styles Inventory, Teaching Styles Inventory, Learning Styles Inventories and Tests on the Web, and Learning Styles Links.

PAPER CODE-9572

LANGUAGE ACROSS THE CURRICULUM

(Including reading and reflecting on text)

Objectives: After the completion of the course, the student teacher will be able to:

1. Understand the language background of students as the first or second language users.
2. Create sensitivity to the language diversity that exists in the classroom.
3. Understand the nature of classroom discourse and develop strategies for using oral language in the classroom.
4. Understand the nature of reading comprehension in the content area & writing in specific content areas.
5. Understand interplay of language and society.
6. Understand function of language and how to use it as a tool.
7. Understand language and speech disorders and make remedial measure, too.

COURSE CONTENT

UNIT –I Language and society

1. Relationship between language and society.

2. Multilingualism- concept, status of Indian classroom language.
3. Deficit theory and discontinuity theory.
4. Social stimulation- gestures, emotional and facial expressions, postures and movements, articulate speech, physiognomy.

UNIT- II Language development

1. Theories of language development
2. Language development in different stages.
3. Speech defects: lisping, slurring, stuttering and stammering and role of teachers in its resolution.
4. Language acquisition: stages, language and thought.
5. Meta- linguistics: concept, meaning, listening, speaking, reading, comprehension and writing for varying context, language proficiency for teacher.

UNIT- III Classroom and language

1. Classroom discourse- nature, meaning and medium.
2. Questioning in the classroom- type of questions, why and how of asking of questions, teachers role and control during questioning, encouraging questioning by students.
3. Functions of language within and outside the classroom.
4. Classroom as a language lab.
5. Role of literature in language learning.

UNIT- IV Reading and writing

1. Reading skills- purpose and methods.
2. Reading in the content areas- science, social science and Mathematics.
3. Reading strategies- note making, summarizing.
4. Process writing- analysis of children"s writing to understand their conception and personality, writing with a sense of purpose, writing to learn and understand.

UNIT –V Reading and Reflecting on text

1. Nature of texts- expository v/s narrative texts, transactional v/s reflective texts
2. Scheme theory- text structures and examining content area.
3. Kinds of text-Textbooks, narratives, autobiographies, field notes, ethnographies.
4. Some practical activities to be conducted in a class -…….
   a. Read a text and prepare a summery

b. Read a document and organize a discussion on it

c. Expressing views on an editorial of a news paper

SESSIONAL WORK

Any two of the following:

1. Find out the different languages spoken by the students and prepare a plan to use multilingualism as a teaching strategy.
2. Identify speech defects of a student and make a remedial strategy.
3. Organize an activity based game to motivate students for creative questioning and present its report.
4. Read any empirical, conceptual, historical work or a policy document or studies about schools, teaching, learning or different people"s experiences and submit reading reflections.
5. Plan a participatory transaction strategy for language acquisition.
6. Prepare abstracts of any two articles published in reputed Journals.

REFERENCES

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2. Anderson, R.C. (1984). Role of the Reader"s Schema in comprehension, learning and memory. In R.C. Anderson, J. Osborn, & R.J. Tierney (Eds.) Learning to read in American school: Basad readers and content texts. Psychology Press.
3. Eller, R.G. (1989). Johnny can"t talk, either: The perpetuation of the deficit theory in classroom: The Reaing Teacher, 670-674.
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PAPER CODE-9573

Course : 24 INTERNSHIP PROGRAMME (School Intership Phase-I)

School Internship is designed to lead to the development of broad repertoire of perspectives, professional capacities, teacher dispositions, sensibilities and skills. During the internship, a student-teacher shall work as a regular teacher and participate in all the school activities, including planning, teaching and assessment, interacting with school teachers, community members and children.

Objectives –

After completion of the Internship the student - teachers will be able to –

1. Develop the understanding of the school and its management.
2. Develop the ability to plan and manage the class-room teaching.
3. Develop the sensibility towards diverse needs of learners in school.
4. Develop ability to discharge various responsibilities expected from a teacher.
5. Organize and conduct the co- curricular activities.
6. Get acquainted with various school records maintained by the school.
7. Maintain records expected from a teacher.
8. Develop skills of conducting community contact programmes.
9. Get acquainted with the functioning of SMC.

Execution of the Internship Programme

The internship programme shall be divided into 2 years. In the first year, 4 weeks will be allotted. This will include one week of school observation and three weeks of practice - teaching during which each student - teacher has to teach 2 periods per day (one period each for 2 pedagogy subjects). Besides teaching, the student - teacher has to complete his/her tasks and assignments related to the courses mentioned in the first year. The three weeks practice teaching will also include the delivery of criticism lessons (one in each pedagogy subject) and also observation of 5 lessons of peers of each of the two subjects. This practice of teaching programme is adopted so as to give a proper training of teaching skills and thorough guidance to the student-teachers by the subject lecturer.

Practice Teaching

S. No.	Activity	Marks
1.	Practice Teaching in both the pedagogy subjects in Schools (for three weeks) (At least 13 lessons in each subject)	50+50=100
2.	Peer Group Lesson Observation(ordinary+criticism-5 lesson in each round (5+5)	5+5=10
3.	Criticism Lessons (1-1 in both pedagogy subjects)	10+10=20
4.	Test (Blue print + question paper + Evaluation Key+Remedial Teaching)	10+10=20
	Total Marks	**150**

PAPER CODE-9574

Course: 25 EXTERNAL ASSESSMENT

ONE FINAL LESSON OF PEDAGOGY OF A SCHOOL SUBJECT

[I YEAR]

4. The weightage of final lesson will be 100 marks. Final lesson will be conducted at the end of first academic year i.e. after the completion of 1st phase of internship.

5. During the final practical examination each candidate will have to teach one Lesson in any one of the two teaching subjects. However, he shall have to prepare lesson plan in both the teaching subjects and should be prepared to deliver lesson in both the subjects if required.

6. The Board of examiners for external examination will consist of:

d) The Principle of the college concerned.

e) One senior member of the college.

f) Two external examiners appointed by the university.

Note: - The selection of the faculty member and two examiners be such that, as for as possible, Board of Examiners represent all the three faculties-Humanities, Languages and Science

S. No.	EXTERNAL EVALUATION [I Year]	Marks
1.	Course 11- Final Lesson (Final Practical Exam)	100
	Total Marks (I Year)	**100**

Paper Code 9605

Course-26 ¼kekU; fgUnh½

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PAPER CODE-9541

THIRD YEAR T.D.C., SCIENCE

(Effective from session 2016-17)

PHYSICS

Paper Code Paper & Title Hrs/week Max. Marks

3161 I: Quantum Mechanics, Atomic and Molecular Physics 2 50

3162 II: Electrodynamics, Electromagnetic Waves and Relativity 2 50

3163 III: Solid State, Nuclear and Particle Physics 2 50

3164 IV: Practical 4 75

Note:

1. Each theory question 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 one or few words**. (Total: 5 Marks)**

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**. (Total 25 Marks)**

Section C shall contain four descriptive questions covering all units and candidates have 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**. (Total 20 Marks)**

Paper-I: 3161, Quantum mechanics and Atomic & Molecular Physics

Unit-I

Introductory Schrodinger theory :

Rise and fall of Plank-Bohr quantum theory Duality of radiation and matter, de Broglie"s hypothesis, justification for the relation , experimental confirmation Phase and group velocities of a wave ; formation of a wave packet, illustrations. Uncertainty principle relating to position and momentum, relating to energy and time, application complimentarity principle, photon interpretation of two slit interference,

Einstein-de-Brroglie relations as a link between particle and wave properties, general equation of wave propogation, propogation of matter waves, time dependent and time independent schrodinger equations, physical meaning of ψ, conditions to be satisfied by schrodinger equation as an operator equation. Postulatery approach to wave mechanics, operators, observable and measurements. Operators, eigen values and eigen functions; linear operators, product of two operators, commuting and non commuting operators, simulataneous eigen functions, orthogonal functions.Hermition operators, their eigen values, Hermition adjoint operators, expectation values of an operator.

Unit – II

Simple one dimensional problem ; particle in a box with rigid walls. Concept of a potential well. Wave functions and energies for the ground and excited states ; quantization of energy qualitative discussion of the solutions for a shallow potential well. Application of Operator methods ; Simple harmonic oscillator, step-up and step-down operators, eigen functions and eigen values of the ground state and excited state, zero point energy probability density and its variations with degree of excitation ; orthogonality of wave functions. Other one dimensional problems ; step potential, penetration through rectangular barrier. Transmission coefficients, barriers of special shapes, quantum mechanical tunneling, particle in of three dimensional cubical box, degeneracy.

UNIT-III

Angular momentum and spin

Central force ; orbital angular momentum, operators for its cartesian components, commutation relations, mutual as well as with L2 , operators L+ and L-, their interpretation as step operators eigen values of L2 , half integral values for quantum numbers. Angular momentum operators in spherical polar coordinates ; evaluation of their eigen functions explicitly in terms of the coordinates, their degeneracy. Schrodinger equation for hydrogen atom in spherical polar coordinates ; separations into radial and angular variation, qualitative discussion of spherical harmonics. Angular momentum and magnetic moment of electron due to orbital motion Bhor mageton.

Unit – IV

Mono valent and divalent atoms

Back ground from quantum theory : The four quantum numbers ; spectral terms arising from L-S oupling, s,p,d,f, notation, selection rules. Half life of excited states, width of a spectral line. Spectra of mono and divalent atoms : Doublet fine structures of hydrogen lines ; screening constant for monovalent atoms, series limits, doublet structure for alkali spectrum. Spectra of helium and alkaline earth atoms, singlet and triplet series. Effect of magnetic field on energy levels : Gyromagnetic ratios for orbital and spin

motions ; vector model, Lande g factor, strong and week field effects, illustrative cases of H, Na, Ca and Hg. X-ray spectra : The continuous x-ray spectrum, Duane and Hunt limit. Characteristic x-rays : Mosley‟s law, doublet fine structure, H-like character of x-ray states, x-ray absorption spectra, absorption edges.

Unit – V

Sharing of electrons : formation of molecular orbitals, H2 + ions H2 - molecule, electronic levels, singlet and triplet characters. Rotational energy levels, internuclear distance.

Vibrational energy levels, force constants, anharmonicity dissociation energy, isotope effects on rotational and vibrational energies. Raman effect (brief study).

Spectra of diatomic molecules : Pure rotation spectra ; selection rules, vibrationrotation spectra, selection rules, vibration-rotation spectra ; selection rules, P, Q and R branches.

Electronic band systems, sequences and progressions Frank-Candon principle. (Statement only, no derivation)

Recent developments in Physics including discussion of Nobel prizes in Physics (no questions to be set in the theory examination).

Text books:

1. Quantum mechanics : S.P. Singh, M.K. Bagde and Kamal Singh (S.Chand and Co
2. Quantum Mechanics by G.R. Chatwal and Anand SK, Himalaya Publishing Co.

Reference books

1. Quantum Mechanics Alistair I M Rac. ELBS (Low Drice edition)
2. Quantum mechanics , S. N. Biswas, Books and Allied, Calcutta (P) Ltd.
3. Atomic and Nuclear Physics ; A.B. Gupta, mew central book agency pvt. Ltd.

PAPER CODE-9542

PAPER-II: 3162, ELECTRODYNAMICS, ELECTROMAGNETIC WAVES

AND RELATIVITY

UNIT – I

Motion of charged particles in **E** and **B** fields: Case of cathode ray oscillograph, positive ray parabola, velocity selector, magnetic focusing, mass spectrography. Faraday‟s law for electromagnetic induction: Faraday‟s law integral and differential forms; self-inductance of a solenoid and of a straight conductor, energy stored in an inductor and in the magnetic field. Displacement current; modified Ampere‟s law,

Maxwell‟s equation for time-dependent electromagnetic field in vacuum and in material media, boundary conditions.

UNIT – II

Electromagnetic potentials: Magnetic vector potential **A** and scalar potential Φ. Poisson‟s equation for **A** in terms of current density, solutions for line surface currents. Coulomb and Lorentz gauge transformations, Lorentz law in terms of potentials.

Maxwell‟s equations and electromagnetic waves: Plane-wave solution for Maxwell‟s equation; orthogonality of **E**, **B** and propagation vector. Poynting vector; energy and momentum propagation, reflection and transmission at dielectric boundaries (normal incidence), polarization by reflection, Brewster‟s angle.

UNIT – III

Electromagnetic waves in conductors: Modified field equation; attenuation of the wave, reflection at and transmission through a conducting surface.Total internal reflection Radiation from accelerated charges: Modification(Conceptual only) of Coulomb‟s law to include velocity and acceleration dependent terms in **E** field. Radiation from an oscillating dipole and its polarization. Radial and spherical power of electromagnetic radiation, Radiation pressure equation in free space and medium

UNIT – IV

The Lorentz transformations: Galilean transformations; Newtonian relativity, instances of their failure; electromagnetism, aberration of light, Michelson-Morley experiment; Einstein‟s basic postulates and geometric derivation of Lorentz transformations; invariance of Maxwell‟s equations, length contraction, simultaneity, synchronization and time dilation, Einstein‟s velocity addition rule, Doppler effect in

light. Relativistic gravitational Red Shift

UNIT – V

Relativistic dynamics: Variation of mass with velocity, mass energy equivalence, relativistic formulae for momentum and energy.

The structure of space-time: Four vectors; invariance of an interval, time-like, spacelike

and light-like intervals, Minkowski space.

Relativistic electrodynamics: Electric field of a point charge in uniform motion; transverse components, magnetism as a relativistic phenomenon, transformation of **E** and **B** fields.

Recent developments in Physics including discussion of Nobel prizes in Physics (no questions to be set in the theory examination).

Text and Reference books:

1. D.J. Griffiths: Introduction to Electrodynamics, Prentice Hall of India, 1989.
2. Reitz and Milford: Introduction to Electrodynamics, Addison-Wesley.
3. A.M. Portis: Electromagnetic Fields
4. J.B. Marion: Classical Electromagnetic radiation (Academic Press)
5. R.P. Feynmann, R.B. Leighton and M. Sands: The Feynmann lectures in physics, Vol. II (B.I. Publications).
6. B. Saraf et al. : Physics through experiments Vol. I – EMF, constant and varying, Vikas Publishing House.
7. D.R. Corson and P. Lorrain: Introduction to Electromagnetic fields and waves, Freeman-Taraporevala, Bombay, 1970.
8. E.C. Jordan and K.G. Balmain: Electromagnetic waves and radiating systems, 2nd Ed., Prentice Hall of India, New Delhi, 1971.
9. Eletrodynamics ,Electromagetic Waves and Relativity (In Hindi) Kalra,Kakani and Bhandari

PAPER CODE-9543

Paper-III: 3163, SOLID STATE, NUCLEAR AND PARTICLE PHYSICS

UNIT – I

Crystal geometry: crystal lattice, crystal planes and Miller indices, unit cells. Typical crystal structures, coordination number, packing fraction, symmetry elements, rotation, inversion and reflection, point groups and crystal classes, space groups.

Crystallography: Bloch functions, Bloch‟s theorem, diffraction of X-rays by a crystal lattice. Laue‟s formulation of X-ray diffraction, reciprocal lattice, Brillouin zones, Laue spots, rotating crystal and Debye-Scherrer methods Introduction to nano particles, Definition, length scales, Importance of nanoscale and Technology.

UNIT – II

Types of binding in solids: covalent binding and its origin, ionic binding, energy of binding, transition between covalent and ionic binding, metallic binding, Van der Waal‟s binding, hydrogen bond.

Conduction in metals : Drude‟s theory, DC conductivity, AC conductivity, plasma frequency, thermal conductivity of metals, Fermi-Dirac distribution, thermal properties of free-electron gas, Sommerfeld‟s theory of conduction in metals.

UNIT – III

Conduction in semiconductor: Bands in solids, metals, insulators and semiconductors. Motion of free electrons on a chain of atoms, effective mass, electrons and holes, donor and acceptor impurities, donor impurity levels. Thermal excitation of carriers, electrical conductivity. Elementary ideas of Hall effect in metals and semiconductors and magnetoresistance. Charge transport in semi-conductors: Ionization energy of impurity atoms, carrier concentration in doped semiconductors at high and low temperatures, control of conductivity of semiconductors by impurities and current flow in semi-conductors.

UNIT – IV

Structure of nucleus: discovery of the nucleus, composition. Basic properties: charge, mass, size, spin, magnetic moment, electric quadrupole moment, binding energy, binding energy per nucleon and its observed variation with

mass number of the nucleus. Coulomb energy, volume energy, surface energy, other corrections, explanation of the binding energy curve. Liquid drop model of the nucleus.

Nuclear forces: two-nucleon system, deuteron problem, binding energy, nuclear potential well, results of p-p and n-p scattering experiments, meson theory of nuclear forces e.g. Bartlett, Heisenberg, Majorana forces and potentials (No derivations)

Radioactivity: decay constant and half-life, spectra of emitters, Geiger-Nuttal law, Gamow‟s explanation. Beta decay: elementary Fermi‟s theory (No derivations). Antineutrino. Nuclear radiation, energy levels.

UNIT – V

Detectors for charged particles: Ion chamber, Geiger counter, resolving time, cloud chamber.

Accelerators: Need for accelerators; cyclic accelerators, cyclotron, betatron, synchrocyclotron, variable energy cyclotron, phase stability. Brief introduction to Accelerator facilities in India.

Rutherford scattering formula, different types of nuclear reactions. Artificial radioactivity: Nuclear fission, neutron reactions, Fermi and transuranic elements, chain reaction, criticality, moderators. Brief discussion of Reactor facilities in India Discovery of cosmic rays: hard and soft components, discovery of muon, pion, heavy mesons and hyperons, mass and life time determination for muon and pion. Primary

cosmic rays: Extensive air showers, solar modulation of primary cosmic rays, effect of earth‟s magnetic field on the cosmic ray trajectories.

Elementary particles: Discovery and important properties, Standard Model Strangeness, conservation of strangeness in particle interactions, quark hypothesis, high energy electron scattering from protons, basic interactions of quarks and leptons, interrelation between particle physics and cosmology. Big Bang theory (Brief study. No derivations) Brief introduction to Larger Hadron Collider “Big Bang” experiments at CERN Recent developments in Physics including discussion of Nobel prizes in Physics (no questions to be set in the theory examination).

Text Book

1. Nuclear Physics, Brijlal & Subramannian

2. Solid State Physics, Charles Kittel

3. Solid State Physics, Nuclear Physics and Particle Physics (In Hindi) Kalra,Kakani and Mandot

Reference books:

1 D.J. Griffiths: Introduction to Electrodynamics, Prentice Hall of India, 1989.

2 Reitz and Milford: Introduction to Electrodynamics, Addison-Wesley.

3 A.M. Portis: Electromagnetic Fields

4 J.B. Marion: Classical Electromagnetic radiation (Academic Press)

5 R.P. Feynmann, R.B. Leighton and M. Sands: The Feynmann lectures in physics, Vol. II (B.I. Publications).

6 B. Saraf et al. : Physics through experiments Vol. I – EMF, constant and varying, Vikas Publishing House.

7 D.R. Corson and P. Lorrain: Introduction to Electromagnetic fields and waves, Freeman-Taraporevala, Bombay, 1970.

8 E.C. Jordan and K.G. Balmain: Electromagnetic waves and radiating systems, 2nd Ed., Prentice Hall of India, New Delhi, 1971.

PAPER CODE-9545

THIRD YEAR B.Sc CHEMISTRY 2018-19
Effective from session 2016-17

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 I : INORGANIC CHEMISTRY

UNIT I

Hard and **Soft Acids** and **Bases (HSAB)** : Classification of acids and bases as hard and soft. Pearson‟s HSAB concept, acid-base strength and hardness and softness. Symbiosis, theoretical basis of hardness and softness, electro-negativity and hardness and softness.

Metal-Ligand Bonding in Transition Metal Complexes : Limitation of valence bond theory, an elementary idea of crystal field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters, John- Teller effect.

UNIT II

Magnetic Properties of Transition Metal Complex : Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, correlation of m and meff values, orbital contribution to magnetic moments, application of magnetic moment data for 3d- metal complexes.

Electronic Spectra of Transition Metal Complexes : Types of electronic transitions, selection rule for d-d transitions, spectroscopic ground states, spectro-chemical series. Orgel-energy level diagram for $d^{\text{‟}}$ and d^9 states, discussion of the electronic spectrum of $[Ti(H_2O)_3]^3$ complex ion.

UNIT III

Bioinorganic Chemistry : Essential and trace elements in biological processes, metallo-porphyrins with special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca^{2+}.

Electro analytical Methods : EMF measurements, pH,- determination using hydrogen, glass, quinhydrone, antimony and calomel electrodes, potentiometric titrations.

Volumetric Estimation : Theory of oxidation - reduction titrations. Theory of complexometric titrations.

UNIT IV

Organometallic Chemistry - Definition, nomenclature and classification of organometallic compounds. Preparation, properties, bonding and applications of alkyl and aryl of Li, Al, Hg, Sn and Ti, a brief account of metal

- ethylenic complexes and homogeneous hydrogenation, mononuclear carbonyls and the nature of bonding in metal carbonyls.

Thermodynamic and Kinetic Aspects of Metal Complexes - A brief outline of thermodynamic stability of metal complexes and factors affecting the, stability, Substitution reactions of square planar complexes.

UNIT V

Molecular Symmetry and Group Theory : Symmetry elements, molecular point groups, group theory and basic properties, similarity transformation and classes, orthogonality theorem, multiplication tables and characters tables of C_{2v} and C_{2v} groups.

Mathematical Techniques : Least square treatment applied to linear equation y = my + c, correlation coefficient, S_m and S_c.

Recent Developments in Inorganic Chemistry: Question will not be asked from the recent development section.

BOOKS RECOMMENDED

1. Group theory and its chemical applications : P.K. Bhattacharya.
2. Inorganic chemistry : J.E. Huyee, Principles of Structure and Reactivity, 3rd Ed.
3. Selected topics in inorganic chemistry : W.U. Malik, G.D. Tuli and R. Madan.
4. Principles of Inorganic Chemistry : D. Banerjee.
5. Modern Aspect of Inorganic Chemistry : H.J. Emeleus and A.G. Sharpe.
6. Inorganic Chemistry (Hindi ed.) : Ameta, Sharma and Metha.

PAPER CODE-9546

PAPER II : ORGANIC CHEMISTRY

UNIT I

Electromagnetic Spectrum : Absorption Spectra : Ultraviolet (UV) absorption spectro-scopy- absorption laws (Beer-Lambert Law), molar absorptivity, presentation and analysis of UV spectra, types of electronic transition, effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchrornic and hypochromic shifts. UV spectra of conjugated enes and enones.

Infrared (IR) absorption spectroscopy- molecular vibrations, Hooke‟s, selection rules, intensity and position of JR bands, measurement of JR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of JR spectra of simple organic compounds.

Nuclear Magnetic Resonance (NMR) spectroscopy : Proton Magnetic Resonance (PMR) spectroscopy, nuclear shielding and desheilding, chemical shift and molecular structure, spin- spin splitting and coupling constants, areas of signals, interpretation of PMR spectra of simple organic molecules such as ethyl bromide, ethanol, acetalclehyde, 1, 1,2 - tribromoethane, ethyl acetate, toluene and acetophenone.

Problem pertaining to the structure elucidation of simple organic compounds using UV, JR and PMR spectroscopic techniques.

UNIT II

Heterocyclic compounds : Introduction, molecular orbital picture and aromatic characteristics of pyrrole, furane, thiophene and pyridine, method of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives, comparision of basicity of pyridine, piperidine and pyrrole.

Introduction to condensed five and six membered heterocycles, preparation and reactions of indole, quinoline and isoquinoline with special reference to Fischer Indole synthesis, Skraup‟s synthesis and Bischler - Napieralski synthesis. Mechanism of electrophilic substituion reactions of indole, quinoline and isoquinoline.

Photochemistry: Principles: electronic excitation, excited states, modes of dissipation of energy , energy transfer and quantum efficiency, photoreduction and photochemistry of butadienes

UNIT III

Organic synthesis via Enolates - Acidity of alpha hydrogen, alkylation of diethylmalonate and ethylacetoacetate, synthesis of ethyl acetoacetate, Claisen condensation. Keto - Enol tautomensm of ethyl acetoacetate, alkylation of 1,3- dithianes, alkylation and acylation of enamines.
Carbohydrates - Classification and nomenclature, monosaccharides, mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses, configuration of glucose and fructose, erythro and threo diastereomers. Conversion of glucose into mannose, formation of glycosides, ether and esters. Determination of ring size of glucose and fructose, Cyclic structure of D (+) - glucose. Mechanism of mutarotation.

An introduction to disaccharide (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination.

UNIT IV

Amino Acids, Peptides, Proteins and **Nucleic Acids** - Classification, structure and stereochemistry of amino acids, acid-base behavior, isoelectric point and electrophoresis. Preparation and reactions of a-amino acids. Structure and nomenclature of peptides and proteins, classification of proteins, peptide structure determination, and group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid-phase peptide synthesis. Structures of peptide and proteins. Levels of protein structure. Protein denaturation! renaturation.
Nucleic acids: Introduction, constituents of nucleic acids. Ribonucleosides and ribonucleotides. The double helical structure of DNA.
Fats, Oils and **Detergents** - Natural Fats, edible and industrial oils of vegetable origin, common fatty acids, glycerides, hydrogenation of unsaturated oils, saponification value, iodine value, acid value, soaps synthetic detergents, alkyl and aryl suiphonates.

UNIT V

Synthetic Polymers - Addition or chain - growth polymerization, free radical vinyl polymerization, ionic - vinyl polymerizations Ziegler-Natta polymerization and vinyl polymers. Condensation or step-growth polymerization, polyesters, polyamides, phenol formaldehyde resins, urea-formaldehyde resins, epoxy resins and polyurethanes. natural and synthetic rubbers.

Synthetic **Dyes** - Colour and constitution (electronic concept), classification of dyes. Chemistry and synthesis of methyl orange, Congo red, Malachite green, Crystal violet, Phenolphthalein, Fluorescein, Alizarin and Indigo.

Recent Developments in Organic Chemistry: Question will not be asked from the recent development section.

BOOKS RECOMMENDED

1. Organic Chemistry, Vol. I and II, S.M. Mukherji, S.P. Singh and R.P. Kapoor, Wiley Eastern Ltd.
2. A Text Book of Organic Chemistry, Vol. I and II, K.S. Tewari, S.N. Mehrortra and N.K. Vishnoi.
3. Organic Chemistry, M.K. Jain and S. Sharma.
4. A Text Book of Organic Chemistry, Vol. I and II, O.P. Agarwal.
5. A Text Book of Organic Chemistry, Raj. K. Bansal.
6. Organic Chemistry, Vol. I and II, I.L. Finar.
7. Organic Reaction and their Mechanisms, P.S. Kalsi.
8. Introduction of Petrochemicals, Sukumar Maiti.
9. Organic Chemistry (Hindi Ed.) Suresh Ameta, Punjabi and Sharma.
10. Organic Chemistry, Morrison and Boyd, Prentice Hall.
11. Fundamentals of Organic Chemistry, Solomons, John Wiley.
12. Organic Chemistry, P.L. Soni.
13. A Text Book of Organic Chemistry, V.K. Ahluwalia and Maduri Goyal, Narosa Publishing House Pvt. Ltd.

PAPER CODE-9547

PAPER III : PHYSICAL CHEMISTRY

Time : 3 Hrs. **M.M. 50**

UNIT I

Elementary Quantum Mechanics : Black-body radiation, Planck's radiation law, photo-electric effect, heat capacity of solids, Bohr's model of hydrogen atom (no derivation) and its defects, Compton effect. Sinusodial wave equation, Hamiltonian operator, Schrodinger wave equation and its importance, physical interpretation of the wave function, postulates of quantum mechanics, particle in one-dimensional box.

Schrodinger wave equation for H-atom, separation into three equations (without derivation), quantum numbers and their importance hydrogen like wave functions, radial wave functions, angular wave function.

Molecular orbital theory, basic ideas- criteria for forming M. 0. from A. 0., construction of M. 0"s by LCAO- H_2 ion, calculation of energy levels from wave functions, physical picture of bonding and antibonding wave functions, concept of s, s, p p4" orbitals and their characteristics. Hybrid orbitals- sp, sp^2, sp^3, calculation of coefficients of A.O"s used in these hybrid orbitals.

Introduction to valence bond model of H_2, M.O. and V. B. models.

UNIT II

Spectroscopy - Introduction: electromagnetic radiation, regions of the spectrum basic features of different spectrometers statement of the Born- Oppenheimer approximation degrees of freedom.

Rotational Spectrum - Diatomic molecules. energy levels of a rigid rotator (semi- classical principles) selection rules, spectral intensity, distribution using population distribution (Maxwell - Boltzmann distribution) determination of bond length, qualitative description of non-rigid rotor, isotope effect.

Vibrational Spectrum - Infrared spectrum, energy level of simple harmonic oscillator, selection rules, pure vibrational spectrums intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of anharmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups.
Raman spectrum: Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules.

Electronic Spectrum - Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck Condon principle. Qualitative description of s, p and n M.O., their energy levels and the respective transitions.

UNIT III

Photochemistry - Interaction of radiation with matter, difference between thermal and photochemical processes, laws of photochemistry, Grotthus - Drapper law, Stark - Einstein law, Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence non-radiative process (internal conversion, intersystem crossing), high and low quantum yields, photosensitization photochemical equilibrium, photoionization photodimerisation of anthracene, photoinhibition. chemical actinometry.

Solutions, Dilute Solutions and **Colligative Properties :** Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solution: colligative properties. Raoult"s law, relative lowering of vapour pressure, molecular weight determination, Osmosis, law of osmotic pressure and its measurement.

Determination of molecular weight from osmotic pressure, elevation of boiling point and depression of freezing point, thermodynamic derivation of relation between molecular weight and elevation in boiling point and

depression in freezing point, experimental methods for determining various colligative properties, abnormal molar mass, degree of dissociation and association of solute, Vant-Hoff factor.

UNIT IV

Ionic Conductance - Electrical transport, conduction in metal and electrolytes, solutions, specific conductance, equivalent conductance and molecular conductance, effect of dilution on conductance, migration of ions, Kohlraush‟s law and its applications, transport numbers and its determination by Hittorfs method and moving boundary methods, ionic mobility, application of conductivity measurement, conductometric titrations.

UNIT V

Chemical Kinetics and Catalysis - Rate of reaction, factors influencing the rate of reaction, concentration, temperature, pressure, solvent, light and catalysis, order of a reaction, zero-order, first order and second order reaction, half life and mean life, conductometric, potentiometric, polarimeteric and spectrophotometric methods of determination of order of reactions, method of integration, half life method and isolation method, experimental methods of kinetics, elementary idea about opposing, parallel, consecutive and chain reaction, effect of temperature on reaction rates. Arrhenius equation, concept of activation energy and its measurement, simple collision‟s theory (hard sphere model), transition state theory (equffibnum hypothesis) limitation‟s.

Theory of unimolecular reactions, catalysis, theory and mechanism, classification of catalysis, enzyme catalysis and its mechanism.

Recent Developments in Physical Chemistry: Question will not be asked from the recent development section.

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. A Text Book of Physical Chemistry : Kundu and Jain.
4. Physical Chemistry (Hindi Ed.) : Suresh Ameta, R.C. Khandelwal, R. Ameta and J. Vardia, Himanshu Pub.

PAPER CODE-9548

THIRD YEAR CHEMISTRY PRACTICALS 2018-19

Time : 5 Hrs (One day) **M.M. 50**

Distribution of Marks

	Exercises	Marks
1.	Synthesis of Inorganic complex and organic compound	10
2.	Analysis by Colorimetry/Solvent extraction/Ion exchange method	7
3.	Qualitative analysis : Organic mixture analysis	7
4.	One Physical experiment	10
5.	Vice-voce	8
6	Records	8
	Total	50 marks

LIST OF EXPERIMENTS

1. Synthesis of Inorganic complexes and organic compounds

Any one of the following preparation may be asked in the examination keeping in view that not more than five students are given the same preparation in a batch of 20 students and nature of preparation should be equally distributed both from the organic and inorganic list.

Inorganic Complexes

(a) Preparation of sodium trisoxalato ferrate (III)

(b) Preparation of Ni-DMG complex.
(c) Preparation of cis-and trans-bisoxalato diaquo chromate (III) ion.
(d) Cuprous chloride
(e) Sodium thiosulphate
(f) Ferrous sulphate from Kipp's waste
(g) Mercury tetrathiocyanate

Organic Synthesis

(a) Acetylation of salicylic acid, aniline, glucose and hydroquinone, benzoylation of aniline and phenol.
(b) Aliphatic electrophilic substitution : Preparation of iodoform from ethanol and acetone.
(c) Aromatic electrophillic substituion ;
Nitration -
Preparation of m-dinitrobenzene from nitrobenzene.
Preparation of p-nitroacetanilide from acetanilide.
Halogenation -
Preparation of p-bromoaccetanilide from acetanilide.
Preparation of 2,4,6-tribromophenol from phenol.
(d) Diazotization/coupling - Preparation of methyl orange and methyl red.
(e) Oxidation : Preparation of benzoic acid from toluene
(f) Reduction : Preparation of aniline from nitrobenezene.
Preparation of m-nitroaniline from m-dinitrobenzene.

2. (i) **Analysis by Colorimetry**
(a) Job's method (b) Mole - ratio method
Adulteration - Food stiffs
Effluent analysis, water analysis
(ii) **Solvent Extraction :** Separation and estimation of Mg (II) and Fe (II).
(iii) **Ion Exchange** : Separation and estimation of Mg (II) and Zn (II).

3. **Qualitative Analysis** : Analysis of an organic mixture containing two solid components separable by water, dil. NaHCO3 and dil. NaOH.

4. **Physical Chemistry Experiment** : Any one of the experiments may be given in the examination.

Chemical Kinetics

Study the kinetics of the following reactions.

Initial rate method: Iodide-persulphate reaction

Integrated rate method:

a. Acid hydrolysis of methyl acetate with hydrochloric acid.

b. Saponification of ethyl acetate.

c. Compare the strengths of HCl and H_2SO_4 by studying kinetics of hydrolysis of methyl acetate

Conductometry

(i) To determine the strength of the given acid conductometrically using standard alkali solution.
(ii) To determine the solubility and solubility products of a sparingly soluble electrolyte conductometrically.
(iii) To study the saponification of ethyl acetate conductometrically.
(iv) To determine the ionization constant of a weak acid conductometrically.

Potentiometry

(i) To titrate potentiometrically the given ferrous ammonium sulphate solution using $KMnO_4/K_2Cr_2O_7$ as titrate and calculate the redox potential of Fe^{3+}/Fe^{3+} system on the hydrogen scale.

(ii) To determine the strength of a given solution of HCl/CH_3COOH by titrating with standard NaOH solution potentiometrically/pH metrically.

Refractometry, Polarimetry

(i) To verify law of refraction of mixtures (e.g. of glycerol and water) using Abbe's refractometer.

(ii) To determine the specific rotation of a given optically active compound.

Colourimetry

(i) To verify Beer - Lambert law for $KMnO_4/K_2Cr_2O_7$ and determine the concentration of the given solution of the substances.

(ii) Estimation of iron colorimetrically.

(iii) Estimation of phosphate colorimetrically.

Virtual Experiments: (any two)

1. Preparation of inorganic/ organic compounds.
2. Kinetic study of acid/base catalyzed hydrolysis of esters.
3. Mechanochemical solvent free reactions.
4. Determination of optical rotation by Polarimetry.\
5. Instrumentation Techniques in spectroscopy (UV, IR, NMR etc)
6. Water Softening
7. Demineralized water
8. Any other virtual experiment related to the content of syllabus and availability of the experimental facilities.

BOOKS RECOMMENDED

1. Practical Chemistry - Giri, Bajpai and Pandey, S. Chand & Co. Ltd., New Delhi.
2. Laboratory Manual in Organic Chemistry, R.K. Bansal, Willey Eastern.
3. Experimental Organic Chemistry, Vol. I and II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.
4. Experiments in Physical Chemistry - J.C. Ghose, Bharti Bhawan.
5. Experiments in General Chemistry, N.r. Rado and U.C. Agarwal, Eastern Press.
6. Practical Chemistry - Suresh Ameta and P.b. Punjabi, Himanshu Publication.

THIRD YEAR B.SC. B.Ed COMPUTER SCIENCE

Paper - I : MULTIMEDIA AND WEB DESIGN

Paper Code - 9560

UNIT-I

Fundamental concepts in Text and Image: Multimedia , Building Blocks of Multimedia. Multimedia and hypermedia, Desirable features of Multimedia system , Data Compression , Multimedia Applications.

UNIT-II

Multimedia Networks: Basics of Multimedia Networks, Multimedia Network Communications and Application, Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks.

UNIT-III

Web Designing Tools:HTML tags,Multiple tags : Nested Tags, Lists, Tables, Frames, Forms, using images in web pages,Inline images , Linking , Background Graphics , Background Color. Images and Hyperlinks.

UNIT-IV

Scripting Languages:VB script-Introduction in VB Script, Data types, operators, control structures, functions and strings.

JavaScript-Introduction to java script, Operators, identifiers, control structures, functions, arrays and error handling, objects.

UNIT-V

Server programming:Introduction to ASP, Writing simple ASP Pages, request and response objects, file inclusion, Tracking users, Application and Session object, sessions, error handling. JSP Overview, implicit objects, Standard Actions.

Recommended Books :

1. **Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI/Pearson Education.**
2. **Internet and World Wide Web, H.M. Deitel, P.J. Deitel, A.B. Goldberg Pearson Education.**

Paper-II : Computer Networks

Paper Code - 9561

UNIT - I

Introduction to Computer Networks and Internet : Computer Networks , Internet , Network Edge , Network Core , Access Networks ,Topologies , The OSI reference model, Function of the layers, History of Computer Network . Applications of computer Network , Types of Network Connections.

UNIT - II

The Physical Layer : Physical Layer and services provided by physical layer, Multiplexing , Type of multiplexing , Switching Networks : Circuit switching , Message switching and Packet switching Networks. Transmission Media.

UNIT - III

The Link Layer and Local Area Networks : Data Link Layer Functions , Flow and error control , Error Detection and Correction, Multiple Access Protocols , Wireless LAN, ATM.

UNIT - IV

The Network Layer : Network Layer , Services provided by Network layer , connection Devices in Network Layer : Repeaters , Bridge , Hubs ,Hub configuration , Routers , Gateway , Switches. routing versus switching. Network Layer Protocol, Addressing in TCP/IP , Internet Protocol Classes of IP addresses. Special IP addresses.

UNIT - V

The Transport Layer : Transport Service and Services Provided to the Upper Layers , Transport Service

Primitives , Elements of Transport Protocols ,The user Datagram Protocol , Principle of Reliable Data Transfer. Transmission Control Protocol , The TCP Connection , Difference between TCP and UDP Protocols , Congestion Control .

Recommended Books :

1. **Data Communication and Networking:- Forouzan Tata McGraw Hill.**
2. **Computer networks :- Tannenbaum**

Paper-III : Operating systems

Paper Code - 9562

UNIT - I

Introduction to Operating Systems: What is an operating system? Operating system's role: user view, System View. Operating System structure , Operating System Operations.

Operating System services,System calls, Type of system calls, system programs, system structure, virtual machines.

UNIT - II

Process Management : Process concept, Process state, Process control block, Process scheduling:Scheduling Queues, Schedulars , context Switch .Operations on processes :Process creation, Process termination , Cooperating processes, Inter-process communication..

CPU Scheduling: Basic Concepts, scheduling criteria, scheduling algorithms: FCFS, SJF, Priority Scheduling , Round Robin scheduling, Algorithm evaluation.

UNIT - III

Process Synchronization: The critical section problem, synchronization hardware, semaphores, classical problems of synchronization, monitors.

Deadlocks:Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

UNIT - IV

Memory Management: Swapping, contiguous memory allocation, paging, Structure of the Page table: Herarchical Paging , Hashed Page tables , Inverted Page tables.

Virtual Memory Management : Demand paging, Process creation, Page replacement, Allocation of frames, Thrashing.

UNIT - V

Storage Management : File concept, File Attributes , File Operations , File types , file structure , Internal file structure .

Access method : Sequential access , Direct access. Directory structure, Directory overview.

File-System Implementation: File-system implementation, Directory implementation, Allocation methods.

Recommended Books :

1. **Operating System Concepts :- Silberschatz G.G.**

PAPER - IV : PRACTICALS
Paper Code – 9563

NOTE : Students are required to perform all the experiments selecting one from each part.
MARKS DISTRIBUTION
PART - A : 20
PART - B : 20
PART -C (POWERPOINT REPRESNTATION) : 10
VIVA : 10
Two RECORDS (Topic covered Part-A & part-B) : 15

PART - A

1. Write HTML script using HTML Basics.
   Document , headings , paragraphs , links , images , buttons
2. Write HTML script using HTML attributes.
   HREF attributes, title attributes , width and height attributes , alt attributes , attributes with/without quotes
3. Write HTML script using HTML headings.
4. Write HTML script using HTML styles.
   HTML styles, background color, text color , text fonts, text size , text alignment.
5. Write HTML script using HTML Text formatting.
   br,strong,b, i , em , small ,mark, del , ins,sub,sup
6. Write HTML script using comments.
   Hidden comments , conditional comments
7. Write HTML script using CSS.
   Inline CSS ,Internal CSS , external CSS, fonts,id & class attributes , CSS borders , CSS padding , CSS margins
8. Write HTML script using Links.

Absolute URL , relative URL, color of links, target of links , images as a link , bookmark link

9. Write HTML script using images.
   An image , image with height and width attributes , image with CSS , image as a link, movingimage , floating image.
10. Write HTML script using tables.
    Tables , borders ,collapsed borders, cell padding, table with headings, horizontal/verticalheadings , caption, alignment , cells span more than one column, cells span more than one row,cell spacing
11. Write HTML script using Lists.
    unordered list , list with bullets , ordered lists , list with numbers,letters,roman letters

description lists , nested lists

12. Write HTML script using HTML block and inline elements.
    styling elements , styling elements
13. Write HTML script using HTML forms.
    Form with text input , radio button input, text field and submit button
14. Write HTML script using Inline Frame.
15. Write HTML script using HTML Forms.

PART - B

1. Write script using VBScript.
2. Write format text with HTML tags and attributes.
3. Write VBScript using function in the head section.
4. Write VBScript using variables.
5. Write VBScript using sub procedures.
6. Write VBScript in head and body section.
7. Write VBScript using conditional statements.
   if .. then .. else , if .. then..elseif , select case
8.. Write VBScript using loops.
   for .. next , for .. each , do .. while
9. Write VBScript using Date and Time functions.
10. Write VBScript using others Built-in functions.
11. Write script using JAVAScript.
12. Write HTML tags with JavaScript.
13. Write JavaScript in head and body section.
14. Write external JavaScript.
15. Write JavaScript to declare variable, assign value and display it.
16. Write JavaScript using conditional statements.
    if, if.. else , random link , switch
17. Write JavaScript Popup Boxes.
    alert box , confirm box , prompt box
18. Write JavaScript using functions.
    call a function, function with arguments , function with return values
19. Write JavaScript using Loops.

for, while , do while , break and continue a loop

20. Write JavaScript using error handling statements.
    try ... catch , Onerror event
21. Write Text using ASP
22. Write ASP formatted text with HTML tags.
23. Write ASP Response object.
24. Write ASP Request object.
25. Call a procedure using VBScript in ASP.
26. Call a procedure using JavaScript in ASP.

PART - C

Power point presentation on the topics covered in Paper -I , Paper - II ,Paper -III as assigned by the concerned teacher.

ZOOLOGY

The third 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: Animal Physiology, Biochemistry and Immunology	**50**
Paper-II : Ecology and Biostatistics	**50**
Paper-III : Ethology and Evolution	**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.

THIRD YEAR TDC SCIENCE- 2018-19

ZOOLOGY

PAPER-I : ANIMAL PHYSIOLOGY, BIOCHEMISTRY AND IMMUNOLOGY

Duration : 3 hours **M.M.: 50**

UNIT-I

1 Histology and function of the gastro-intestinal tract, liver, pancreas, lungs, kidney, testis and ovary.

2 Histology, functions and disorders of endocrine glands – pituitary, pancreas, adrenal, thyroid and parathyroid.

3 Digestion and absorption of food in alimentary canal.

UNIT-II

4 Metabolism of carbohydrates: Glycolysis, decarboxylation of pyruvic acid, Krebs cycle, electron transport system and oxidative phosphorylation; glycogenesis and glycogenolysis.

5 Metabolosm of proteins: Essential and non-essential amino acids, metabolism of amino acids, biosynthesis of glutamic acid..

6 Metabolism of lipids : Biosynthesis of saturated fatty acids and B-oxidative pathways of fatty acid,; formatio9n of ketone bodies..

UNIT-III

7 Respiration: Mechanism of respiration, vital capacity of lungs, transport of gases, dissociation curve of oxyhaemoglobin and control of respiration, chloride shift.

8 Blood: structure and functions of blood cells, ABO blood troups and Rh factor, mechanism of blood clotting.

9 Ultrastructure of cardiac and skeletal muscles. Physiology of muscle contraction.

UNIT-IV

10 Excretion : Structure and function of nephron, control of renal function.

11 Nerve physiology: Ultrastructure of neuron, synapse, conduction of nerve impulse and neuromuscular junctions.

12 Reproductive physiology: Hormonal control of testicular and ovarian functions with reference to estrous and mentstrual cycles.

UNIT-V

13 Immunology: Definition, types of immunity: innate and acquired, humoral and cell-mediated.

14 Cell of immunity: macrophages, lympho9cytes (B and T types), T-helper cells, T-killer cells, plasma cells and memory cells.

15 Antibody : definition structure and functions of each class of immunoglobulins.

16 Antigen: antigenecity of molecules, haptens. Antigen – antibody reactions, precipitation reaction, agglutination reaction, neutralizing reaction, complementary and lytic reactions and phagocytosis.

PAPER CODE-9550

THIRD YEAR TDC SCIENCE- 2018-19

ZOOLOGY

PAPER-II : ECOLOGY AND BIOSTATISTICS

Duration : 3 hours **M.M.: 50**

UNIT-I

1 Terminology and scope of Ecology.

2 Habitat and niche

3 Ecosystem: Components of ecosystem, energy flow and nutrient cycles, food chain, food web and ecological pyramids.

4 General idea of population and community ecology

UNIT-II

5 Freshwater environment: Physico-chemical features and biotic communities, productivity and eutrophication.

6 Marine environment: Characteristics, zonation, fauna and their adaptation, deep sea and estuarine fauna.

7 Terrestrial environment: General characteristics of desert, grass land and forest ecosystems.

UNIT-III

8 Environmental pollution: Biodegradable and non-biodegradable pollutants.

9 Air pollution: Source, nature, prevention and control, green house effect, ozone depletion and global warming.

10 Water pollution: Source, nature and abatement.

11 General account of noise pollution and radioactive pollution.

UNIT-IV

12 Conservation of natural resources: Wild life management, brief idea of national parks and wild life sanctuaries of India. Threatened and endangered species of India.

13 Environmental planning and environmental impact assessment.

14 Brief account of environmental Acts and Legislations (enacted after 1970).

UNIT-V

15 Concepts and applications of Biostatistics.

16 Frequency distribution, graphical presentation, mean, mode, median, standard deviation and standard error.

17 Correlation, T-test, Chi-square test.

18 Shanon and Weinner diversity index.

PAPER CODE-9551

THIRD YEAR TDC SCIENCE- 2018-19

ZOOLOGY

PAPER-III : ETHOLOGY AND EVOLUTION

Duration : 3 hours **M.M. : 50**

UNIT-I

1 Introduction and history of Ethology.

2 Methods of studying behaviour.

3 Neuroanatomical, neurophysiological, neurochemical, focal and scan sampling techniques.

4 Evolutionary approach to behaviour, levels of natural selection.

5 Human Ethology, general aspects.

6 Orientation taxes and kinesis.

7 Brief idea of learning.

UNIT-II

8 Social organization with reference to dominance, hierarchy, social competition and territoriality.

9 Reproductive behaviour with reference to courtship, mating, parental investment and stickle back fish (sexual dimorphism).

10 Elementary idea of role of pheromones and hormones in insects and vertebrates in relation to behaviour.

11 Adaptation and behaviour of Tiger.

UNIT-III

12 Origin of life

13 History of evolutionary thought Lamarckism and Neo-Lamarckism

14 Darwinism and Neo-Darwinism

15 Evidences of organic evolution.

16 Concept of micro and mega -evolution

UNIT-IV

17 Variation: Kinds and sources, role in evolution.

18 Isolation and speciation, definition, isolating mechanism, origin of species and processes of speciation.

19 Adaptation: Definition, kinds of adaptations, adaptive radiation, convergence and divergence.

20 Geological time scale

UNIT-V

21 Brief account of Zoogeographical regions of world

22 Fossils and their evolutionary significance.

23 Phylogeny of horse.

24 Evolution of man.

PAPER CODE-9552

THIRD YEAR TDC SCIENCE, 2018-19

ZOOLOGY - PRACTICAL

Duration : 5 Hrs. **M.M. :50**

S.No	Exercise	
1	Dissection	10
2	Ecology/ Ethology exercise	05
3	Physiological and Biochemical exercise	04
4	Spots (1-10)	15
5	Viva-voce	8
6	Record	8
	Total :-	**50**

Major Dissection marks will be given only if virtual dissection is available otherwise marks may be given according to availability of dissection alternate.

ETHOLOGY AND EVOLUTION.

1 Habituation in earthworm/mosquito larvae.

2 Feeding behaviour of housefly/stored product pest.

3 Antennal grooming behaviour of cockroach.

4 Trial and error and latent learning in rat /mice.

5 Phototaxis and chemotactic behaviour in *Paramecium*.

6 Visit to a zoo/natural habitat of wild animals.

7 Demonstration of social behaviour by honey bee colony.

8 Adaptive modifications in the feet of birds.

9 Adaptive modification in the beak of birds.

10 Adaptive modification in the mouth parts of insects.

11 To study nests and nesting habits of the birds and social insects.

12 To study the phototaxis behavior in insect larvae.

13 Study of circadian functions in animals (daily eating, sleep and temperature patterns)

BIOCHEMICAL, PHYSIOLOGICAL AND ECOLOGICAL EXERCISES

1 Various biochemical tests of

(a) Proteins

(b) Carbohydrates

(c) Lipids

2 Action of salivary amylase.

3 RBC and WBC counts.

4 Estimation of Haemoglobin.

5 Blood groups (ABO and Rh).

6 Measurement of blood-pressure.

7 Abnormal and normal values of constituents of urine.

8 Water analysis: pH, alkalinity, dissolved oxygen, chloride and transparency.

9 Soil analysis: texture, moisture, organic and inorganic contents.

DISSECTIONS:

- **Digital animals:** Virtual dissection will be done (if facility of virtual is made available by University).
- Virtual dissection of Scoliodon cranial nerves and brain

MUSEUM SPECIMENS/ SLIDES SHOWING ADAPTATIONS :

Students are required to write about specific adaptations of following animals in relation to habit and habitat only:

Cursorial : *Acinonyx jubatus*, *Equus caballus*, *Moschus moschiferous.*

Flight : *Columba livia, Pteropus*, *Draco*, *Exocoetus*, *Papilio.*

Arboreal : *Chamaeleon, Hyla, Preshytis.*

Aquatic : *Physalia, Chiton, Hydrophis, Labeo Anguilla, Notopterus*

Fossorial : *Pheretima*, *Teredo*, *Chaetopterus, Talpa*, *Lepus*, *Ichthyophis, Naja.*

Parasitic : *Taenia, Fasciola, Enterobius, Ascaris, Schistosoma, Hirudinaria*, *Pediculus*, *Ixodes.*

- The teacher concerned will provide e-materials to practical in the form of video or demonstrations or written materials including dissections.

REFERENCE BOOKS (LATEST EDITIONS):

ANIMAL PHYSIOLOGY :

1 William S. Hoar, General and Comparative Physiology, Prentice Hall of India Pvt. Ltd.

2 Wood, D.W., Principles of Animal Physiology.

3 Prosser CL., Comparative Animal Physiology, Satish Book Enterprise.

4 Eckert, Animal Physiology. (W.H. Freeman).

5 Ganong : Review of Medical Physiology (Lange).

BIOCHEMISTRY :

6 Stryer, L : Biochemistry (Freeman)

7 Conn et al : Outlines of Biochemistry (Wiley)

8 R.K.Murray et al, Harpers Biochemistry, Lang Medical Book.

IMMUNOLOGY

9 Roitt I : Essential Immunology (ELBS)

10 Kuby : Immunology (W.H. Freeman).

ECOLOGY

11 Odum : Ecology (Amerind).

12 Odum : Fundamentals of Ecology (Saunders).

13 Ricklefy : Ecology (W.H.Freeman).

BIOSTATISTICS :

14 Green, R.H.Sampling design and statistical methods for environmental biologists. John Wiley and Sons New York.

15 Snedecor, G.W. and W.G. Cochran. Statistical methods. Affilited East-West Press, New Delhi (Indian Ed.)

16 P.N.Arora and P.K.Malhan, Biostastics, Himalaya Publishing House, Bombay.

ETHOLOGY

17 Drickamer & Vessey: Animal Behaviour, Concepts, Processes and Methods (Wadsworth).

18 Grier : Biology of Animal Behaviour (Mosby College)

19 Immelmann : Introduction to Ethology (Plenum Press)

20 Lorenz : The Foundation of Ethology (Springer-Verlag)

21 Manning : An Introduction to Animal Behaviour (Addison-Wesley)

22 Reena Mathur : Animal Behaviour, Rastogi Publications, Merrut.

EVOLUTION :

23 Dobzhansky, Ayala, Stebbins & Valentine : Evolution (WH Freeman)

24 Dobzhansky : Genetics and Origin of species (Columbia University Press)

25 Major : Population, Species and Evolution

26 White : Animal Cytology and Evolution.

27 Moody : Introduction to Evolution

28 Savage : Evolution (Holt, Reinhart and Winston).

PRACTICAL :

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

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

31 Verma PS & Srivastava PC, Advanced Practical Zoology, S.Chand & Co.

PAPER CODE-9553

THIRD YEAR B.Sc. Botany Effective from session 2016-17

PAPER I: Paper Code…….

ENVIRONMENTAL BIOLOGY AND PHYTOGEOGRAPHY

Unit-1

Definition, scope and aims of ecological studies, relation with other sciences; factors affecting plant growth and distribution - climatic, edaphic, biotic and topographic. **-10 hours**

Unit-2

Plant population - natality, mortality, age and sex ratio, growth rate, biotic potential. Plant Community - concept and characters (qualitative and quantitative characters); Plant succession - xerosere, hydrosere. Ecosystem concept - structure and function : food chain, food web, trophic levels, ecological pyramids, energy flow and biogeochemical cycles. **-10 hours**

Unit-3

Pollution : air, water, land, noise and their control. Conservation and management of natural resources, endangered plants and their conservation; biosphere reserves, National Parks and sancturies; Chipko movement.

-10 hours

Unit-4

Biodiversity and its Conservation; Hotspots in India. Morphological, Anatomical and Physiological adaptations of hydrophytes, xerophytes and halophytes; natural vegetation of Rajasthan. Plant indicators. **-10 hours**

Unit-5

Phytogeography - definition, aims, objectives, scope and relation with other disciplines; phytogeographical regions of world and India; continuous and discontinuous distributions, endemism, continental drift theory, land bridges, age and area hypothesis, migration.

-10 hours

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**

THIRD YEAR B.Sc. Botany Effective from session 2016-17

PAPER II: Paper Code…….

PLANT PHYSIOLOGY AND BIOCHEMISTRY

Unit-1

Different models of cell membrane to explain structure and function; water relations – osmosis, diffusion, diffusion pressure deficit (DPD), turgor pressure, wall pressure; concept of water potential. Mechanism and factors affecting transpiration, role of macro and micro elements, carrier concept of ion absorption. **-10 hours**

Unit-2

Photosynthesis - photosynthetic pigments; light absorption and mechanism of carbon fixation, C3 and C4 plants. Brief account of CAM, photorespiration, CO2 compensation point. Factors affecting photosynthesis. Enzymes : general characteristics, traditional and modern methods od enzyme classification, mode of action. Isozymes. **-10 hours**

Unit-3

Respiration - glycolysis, Krebs cycle, electron transport system and oxidative phosphorylation, factors affecting respiration. Synthesis and degradation of fatty acids. **-10 hours**

Unit-4

Plant Growth Regulators : auxins, gibberellins, cytokinins, ethylene and abscisic acid, their physiological effects and application in agriculture and horticulture; Seed dormancy, senescence, photoperiodism and vernalization. **-10 hours**

Unit-5

Principles and use of following techniques : pH metry, centrifugation, colorimetry, chromatography. Microscopy: light and compound; scanning electron microscopy. **-10 hours**

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-9555

THIRD YEAR B.Sc. Botany Effective from session 2016-17

PAPER III: Paper Code…….

MOLECULAR BIOLOGY AND BIOTECHNOLOGY

Unit-1

Bacterial genome. Methods of genetic recombination in bacteria (Transformation, Transduction and Conjugation). Principles of recombinant DNA technology. Basic tools and techniques. *Neurospora* genetics. Molecular aspects of biological nitrogen fixation. **-10 hours**

Unit-2

Structure, chemistry and types of nucleic acids. Replication of DNA. Central dogma, transcription and translation, genetic code. Gene regulation - operon model, twocomponent regulatory system. **-10 hours**

Unit-3

History of plant tissue culture, contribution made by Haberlandt, White, Nobecourt, Gautheret, Steward, Reinert, Morel and Vasil. Highlights of work done by Indian Scientists. Basic tools and techniques of plant tissue culture, maintenance of aseptic conditions, Laminar Air Flow Bench, Autoclave, Growth Chamber, methods of sterilization, culture media and their preparation. **-10 hours**

Unit-4

Explant types, initiation of cultures, maintenance of cultures, callus and liquid suspension culture, single cell culture, protoplast isolation, purification, culture and regeneration. Regeneration *in vitro* through organogenesis, somatic embryogenesis, androgenesis and haploid production. **-10 hours**

Unit-5

Methods of gene transfer in plants - microinjection, electroporation, particle - gun technology, *Agrobacterium*-mediated gene transfer. Plant tissue culture in Industry. Secondary plant products with special reference to alkaloids. Prospects of drug production in cell cultures and Bioreactor. **-10 hours**

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-9557

THIRD YEAR B.Sc. MATHEMATICS 2017-18

PAPER – I

REAL ANALYSIS

Duration: 3 Hours **Max. Marks: 50**

UNIT - I

Real number system:

(i) Field, ordered field, upper and lower bounds of a set in an ordered field. Superemum and infimum of a set and their properties. Completeness, Archimedean and denseness properties of an ordered field, the set Q of rational numbers as a non-complete dense. Archimedean ordered field and the set R of real numbers as a complete dense Archimedean ordered field,

(ii) Open interval, closed interval, neighbourhood of a number. Real line R-Interior points and limit points of a set in R, open sets and closed sets in R and their properties, Nested Interval property. Bolzano-Weierstrass theorem, Heine Boral theorem, Compact set and connected set and their properties.

UNIT - II

(i) Sequence, Bounded sequence, monotonic sequence, limit of a sequence, convergent sequence, properties of convergent sequence, Cauchy first and second theorems on limits, subsequence and it's properties, Cauchy sequence and it's properties, Cauchy general principle of convergence, Examples of convergent sequences.

(ii) Series: Convergence and divergence of an Infinite series of real numbers, the necessary and sufficient conditions, various tests of convergence problems and their illustrations with regard to infinite series of positive terms. Series: Alternating series and Leibnitz test, absolute and semi (or conditional) convergence.

UNIT-III

Riemann Integration: Upper and Lower Darboux sum, Upper and Lower Riemann integrals, Riemann integrability of a bounded function in a closed interval, the necessary and sufficient condition for R integrability in terms of Darboux sums, properties of R-integrable functions, Fundamental theorem of integral Calculus.

UNIT - IV

(i) Uniform convergence of sequences and series of functions, various tests including M_n-test and Weirstrass M-test, relations of uniform convergence with the continuity of the limit and the sum functions and also with term by term differentiation and term by term integration.

(ii) Fourier series representation of periodic functions which are even, odd and none of these in the full interval or half the interval.

UNIT - V

(i) Convergence of improper integrals - various tests and their applications, Evaluation of such integrals.

(ii) Equivalent sets and their examples, nature of the relations of equivalence. Denumerable and non numerable sets, countable and uncountable sets, Nature of subsets of a countable set and that of a denumerable (countable) sets, union of denumerable (countable) sets, Denumerability of the sets of integers and rational numbers and non denumerability of the closed unit interval [0, 1] and the sets of real numbers and irrational numbers.

References:

1. T. M. Apostol : Mathematical Analysis.
2. R. R. Goldbeg : Real Analysis
3. Walter Rudin : Principles of Mathematical Analysis
4. P.K. Jain& S. K. Kaushuik : An introduction to Real Analysis.
5. D. Somasundaram & B. Chaudhary : A First Course of Mathematical Analysis.
6. G. F. Simmon : Introduction to Topology.
7. Bhargava & Goyal : Real Analysis.
8. Gokhroo & others : Real Analysis.
9. Sharma & Purohit : Elements of Real Analysis.

PAPER CODE-9558

THIRD YEAR B.Sc. MATHEMATICS 2017-18

PAPER – II

ABSTRACT ALGEBRA

Duration: 3 Hours **Max. Marks: 75**

UNIT – I

Rings, definition and examples of various kinds of rings, integral domain, division ring, field, characteristic of a ring and integral domain, subring and subfield With examples. Left and right ideals with examples and properties, Principal ideal, principal ideal ring. Maximal, prime and Principal ideals in Commutative rings and their theorems.

UNIT -II

Quotient ring, Homomorphism and isomorphism in rings, kernel of homomorphism, Fundamental theorem of ring homomorphism. The three isomorphism theorems in rings, Embedding of a ring into a ring with unity and also into a ring of endomorphism of some abelian groups, Quotient field of an integral domain.

UNIT - III

Definition and various examples of vector spaces, subspaces and examples, Intersection, sum and direct sum of two subspaces, Linear span, Linear dependence, independence and their basic properties and problems.

UNIT- IV

Basis, Dimension and examples, Finite dimensional vector spaces, Existence theorem for a basis, Extension theorem, Invariance of the number of elements of a basis set, Existence of complementary subspaces of a subspace of a finite dimensional vector space, Dimension of sum (and direct sum) of two subspaces, Quotient space and its dimension.

UNIT - V

Linear transformations, Rank and Nullity of a linear transformation,Sylvester law of nullity, to obtain a matrix from a linear transformation and vice-versa and their problems relating to the same and different bases. The algebra of linear transformations, dual space and dual basis and dimension of dual space, bidual space and natural isomorphism (Reflexivity).

References:

1. Surjeet Singh and Quazi Zarneeruddin : Modern Algebra.
2. I.N.Herstein : Topics in Algebra.
3. R.S.Agrawal : Algebra.
4. Gokhroo, Saini : Advance Abstract Algebra.
5. Shanti Narayan : A Text-Book of Modern Abstract Algebra.

6. Hoffman and Kunze : Linear Algebra, (Second Edition).

7. Purohit, Pareek and Sharma : Linear Algebra.

8. Halmos, Paul R : Finite - Dimensional Vector spaces.

Paper –III (Optional): Any one of the following papers –

PAPER CODE-9559

THIRD YEAR B.Sc. MATHEMATICS 2017-18

PAPER -III (A)

DISCRETE MATHEMATICS

Duration: 3 Hours **Max. Marks: 75**

UNIT – I

Sets and propositions – cardinality, Mathematical Induction, Principle of Inclusion and exclusion. Computability and formal language- ordered set. Language phrase structure Grammars. Types of Grammars and languages. Permutation and combinations: Simple problems.

UNIT –II

Relations and functions:- Binary Relations, Equivalent Relations and Partitions, Partial order relations and lattices, Pegeon Hole principle. Graphs and planar graphs: - Basic Terminology; Multigraphs, weighted graphs, paths and circuits shortest paths. Eulerian paths and circuits. Planar graphs.

UNIT – III

Trees: Rooted trees, Binary tree, Decision or sorting tree, spanning tree, minimal spanning tree. Pumping lemma. Finite state machine: Equivalent machines, Finite state machine as Recognizers. Analysing Algorithms– Time complexity, complexity of problems.

UNIT –IV

Recurrence Relations and Recursive Algorithms: Linear Recurrence Relations with constant coefficients, Homogeneous solutions, Particular solution, Total solution, Solution by the method of generating functions.

UNIT – V

Brief review of groups and Rings. Boolean Algebras – Lattices and Algebraic structures. Duality, Distribution and complemented Lattices, Boolean Lattice and Boolean Algebras, Boolean function and expressions, Propositional calculus, Design and Implementation of Digital network - Switching circuits.

References:

1. C.L. Liu : Elements of Discrete Math emetics
2. K.D. Joshi : Foundation of Discrete Mathematics

3. Mradula Garg & R. Panday : fofoDr xf[k`r

4. Gokhroo et.al : विविक्त गणित

PAPER CODE-9559

THIRD YEAR B.Sc. MATHEMATICS 2017-18

PAPER- III (B)

NUMERICAL ANALYSIS AND OPERATIONS RESERCH

Duration: 3 Hours **Max. Marks: 75**

UNIT - I

Differences, Relation between differences and derivatives, differences of Polynomial, Newton-Gregory formula for forward and backward interpolation, divided differences. Newton's General interpolation formula, Lagranges's interpolation formula.

UNIT - II

Gauss's central difference formula, Stirling's and Bessels interpolation formula, Inverse interpolation. Numerical differentiation, Derivatives from Interpolation formulae, Method of operators, Numerical Integration: Newton-cotes Quadrature formula, Trapezoidal, Simpson's one third, Simpson's three-eight rules.

UNIT-III

Gauss Quadrature formulae, Estimation of errors in quadrature formula, location of roots by Descarte's method of sign, Newtons theorem on multiple roots, Numerical solution of Algebraic and Transcendental equations, Bisection method, Regula-Falsi method, Method of integration .

UNIT-IV

Introduction to linear programming problems, Mathematical formulation Graphical method of solution of linear programming problems (Problems of two variables only), Theory of convex sets, Theory of Simplex method and its applications to simple linear programming problems.

UNIT - V

Concepts of duality in linear programming, formation of dual problems, Elementary theorems of duality. Assignment and transportation problems and their optimum solutions.

References:

1. C. E. Froberg : Introduction to Numerical Analysis

2. M. K. Jain, S. R. K. Iyenger and R.K. Jain : Numerical methods: Problems & solutions

3. G. Hadley : Linear Programming
4. Kanti Swaroop, P. K. Gupta and Man Mohan : Operation Research
5. H.C. Saxena : Numerical Analysis
6. Goyal, Mittal : Numerical Analysis
7. Goyal, Mittal : Numerical Analysis (Hindi ed.)
8. Goyal, Mittal : Numerical Analysis (Hindi ed.)
9. Goyal, Mittal : Operations Research
10. S.D.Sharma : Operations Research
11. Gokhroo, Saini, Jain : Operations Research (Hindi ed.)
12. Bhargava, Bhati, Sharma : Linear Programming (Hindi ed.)
13. Gokhroo, Saini, Jain : Linear Programming (Hindi ed.)

PAPER CODE-9559

THIRD YEAR B.Sc. MATHEMATICS 2017-18

PAPER- III(C)

MATHEMATICAL STATISTICS

Duration: 3 Hours **Max. Marks: 75**

UNIT -I

Probability: Definitions of Probability, Addition and Multiplication laws, Conditional probability , Independent events, Baye's Theorem.

UNIT II

Random variable, Distribution function, Probability mass & density functions, probability distribution, Joint, marginal and conditional probability functions.

UNIT –III

Mathematical expectation and Moments, Addition & Multiplication law, Covariance, Expectation and Variance of linear combination of two variables, Moment generating, cumulant generating & characteristic functions.

UNIT –IV

Theoretical Probability distributions- Binomial, Poisson and Normal distributions and their properties.

UNIT –V

Curve fitting by the principle of least squares, fitting of straight line and parabola, Bivariate linear correlation and regression.

Books Recommended:

1. Mathematical Statistics, J. N. Kapur & H.C. Saxana, S. Chand & Co., New Delhi.

2. Fundamentals of Mathematical Statistics, V. K. Kapoor & S.C. Gupta, Sultan Chand & Sons, New Delhi.

3. Mathematical Statistics by Dr. Gokhroo & Saini.

NOTE:

Candidates who have offered Statistics as an optional subject will not be permitted to offer the paper III (B) and III (C). Candidates who have offered Computer science as an optional subject will not be permitted to offer paper III (B).

FORTH YEAR

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**

PAPER CODE-9671

EDUCATIONAL MANAGEMENT AND CREATING INCLUSIVE SCHOOL

Objectives: After completing the course the student Teachers will be able to -

1. Develop understanding about concept and importance of Educational Management
2. Understand the educational Management structure at different levels.
3. Understand the role of Heads and Teachers in School Management.
4. Understand the importance of Management of different resources in school system
5. Develop an institutional plan for a secondary school
6. Understand the characteristics of inclusive school and appreciate diversity
7. Develop skills and practices for creating inclusive school so as to address the special needs of children with different backgrounds.

COURSE CONTENT

UNIT-1 Introduction to Educational Management

1. Concept, need, Functions & recent trends in Education Management
2. Characteristics of Effective Educational Management.
3. Management structure of education in India at different levels – Centre, State and Local.
4. Educational Management in the state of Rajasthan with special reference to School Education.

UNIT-2 Management of Resources

1. Leadership role of Principal – Characteristics & skills. Role in building the climate of a school.
2. Material resource Management.
3. Human Resource Management – Recruitment, Orientation and Professional development of Teachers.
4. Financial Management –Budgeting, Monitoring and Auditing.
5. School community Symbioses – Utilization of Community resources for school development, role of PTA and SMC.
6. Managing school supervision- Concept, need, principles, scope and techniques of supervision.

UNIT-3 Management of School Activities

1. Time Management – School Calendar, preparation of time table – concept, principles, types
2. Curricular & Co curricular activities- Their importance, Principles, planning and effective organization.

3. Institutional Planning, Concept, Areas and Steps

UNIT-4 Inclusive Education:

1. Meaning, Need and Importance of inclusive education
2. Historical overview of education of children with disabilities – from welfare to right
3. Policies related to inclusive education
4. Barriors of Learning and Participation
5. Challenges in Inclusive Education.

UNIT-5 Creating inclusive School

1. Characteristics of inclusive school
2. Understanding student needs.
3. Inclusive Practices – Collaboration, Team work peer strategies and innovative instructional practices.
4. Role of Teacher in inclusive education
5. Role of Principal in managing inclusive schools.
6. Role of Government for promoting inclusive education.

PRACTICUM/ SESSIONAL WORK

(One from each of the following two sections)

Section -A

1. Study of an institutional plan of a school
2. A critical study of a secondary school time-table
3. Study the management of co-curricular activities of a school.
4. Study the leadership role of Headmaster of a Secondary School.

Section -B

1. Case-study of an inclusive school.
2. Case study of an individual with disability.
3. Study of inclusive practices of a secondary school.

REFERENCES

1. Agrawal, J.C. (2010) Shiksha Vyavastha Ka Adhar Tatha Prabandhan, Agra, Agrawal Publications.
2. Allen, L.A. (1995) – Management and Organization, McGraw-Hill Auckland.

3. Baquer, A & Sharma, A. (1997) Disability: Challenges VS Responses: CAN, New Delhi.
4. Bhatnagar, Suresh (1996), Shaikshik Prabandh Avam Shiksha Ki Samasyaye, Meerut, Surya Publication.
5. Dave, Amritlal Avam Anya (2015), Bharat Me Shaikshik Vyavastha Avam Vidyalaya Prabandh, Meerut, R. Lall Book Depot.
6. Farrell, M. (2004) Special Educational Needs: A Resources for Practitioners, New Delhi, Sage Publications.
7. Hearty, S. & Alur, M. (eds.) (2002) Education and Children with Special Needs: From Segregation to Inclusion. New Delhi, Sage Publications.
8. Jaswant Singh (1959), How to be successful the school Headmaster, Jalandhar, University Publishers.
9. Khan, M.S. (1996) – Educational Administration, ES-362, Block-4, New Delhi.
10. Kochar, S.K. (1970, Secondary School Administration, New Delhi, Sterling Publishers.
11. Kochhar, S.K. (1994) – Secondary School Administation, Sterling Publishers, New Delhi.
12. Mahajan, Baldev (1996), Educational Administration in Rajasthan, New Delhi, Vikas Publishing House (Private) Limited.
13. Mohanty, J. (2000) – School Management, Administration and Supervision, Deep and Deep, New Delhi.
14. Mohi-u-ddin, M.S. (1962) School Organization and Management, Baroda, Acharya Book Depot.
15. Mukerji, S.N. (1963), Secondary School Administrating, Baroda, Acharya Book Depot.
16. Mukherji, S.N. (1962), Administration of Education in India, Baroda, Acharya Book Depot.
17. NCERT (2000) Assessment of Needs for Inclusive Education: Report of the First Regional Workshop for SAARC Countries, NCERT, New Delhi, India.
18. Puri, M. & Abraham, G. (eds.) (2004) Handbook of Inclusive Education for Educators, Administrators, and Planners, New Delhi, Sage.
19. Reynolds, C.R. and Janzen, F.E. (eds.) Encyclopedia of Special Education: A reference for the Education of the Handicapped and other Exceptional Children and Adults, Vol. No. 2 ed. USA, John Willey and Sons, Inc.
20. Safaya, R.N. (2006), Modern School Administatoin and Organziation, New Delhi, Dhanpat Rai Publishing (Pvt.) Limited.
21. Sidhu, K.S. (1992) – School Organization and Administration Sterling Publisher, New Delhi.
22. The persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation Act (1995) Ministry of Law, Justice and Company Affairs (Legislative Department)

PAPER CODE-9672

KNOWLEDGE AND CURRICULUM

Objectives: On completion the course the student teacher will be able to:

1. Develop understanding of meaning philosophical basis and sourses of knowledge.
2. Develop understanding of the relationship between knowledge and curriculum.
3. Develop understanding of Activity, Discovery and Dialogue related to modern child centered education with reference to Gandhi, Tagore, Dewey, Plato and Freire.
4. Understand the concept of Nationalism, Secularism and Universalisation with special reference to Tagore and J.krishnamurthi.
5. Understand the changes brought about by Industrialization,
6. Implications of Democracy, Individual autonomy, Equality, Social justice for education.
7. Understand the difference between Curriculum framework, Curriculum, Syllabus and textbook.
8. Understand the Principles of Curriculum Construction.
9. Understand the assessment modes of Curriculum Evaluation.

COURSE CONTENT

UNIT- I Epistemology, Knowledge and Knowing

1. Epistemology: Meaning; Philosophical basis of Knowledge according to Western and Indian Philosophy.
2. Distinction between : Knowledge and Belief; Knowledge and Information ; Knowledge and Skill; Knowledge and Reason; Knowledge and Education; knowledge and Training
3. Facets of Knowledge Such as Local and Universal ; Concrete and Abstract ; Theoretical and Practical; Contextual and Textual; School and out of School.
4. Process of Knowing Process of Construction of Knowledge; Factors involved in construction of Knowledge; The role of Knower and Known in Construction and Transmission of Knowledge; The role of Culture in Knowing

UNIT -II Forms of Knowledge and Its Organization in Schools.

1. Categorization of Knowledge; Basis of Categorization;
2. The essential forms of Knowledge.
3. Basis of selection of categories of Knowledge in School Education.
4. The responsibility of Selection Legitimacy of inclusion of knowledge in School curriculum.

UNIT- III Educational Thinkers and Child Centered Education

Basis of Child Centered Education in relation to Activity, Discovery and Dialogue with reference to Gandhi, Tagore, Dewey, Plato and Freire. Social basis of Education in the context of society in relation to Democracy, Industrialization and Ideas of Individual Autonomy Equality and Social- justice.

1. Concepts of Nationalism, Universalization and Secularism and their interrelationship with education.
2. Critical Multiculturalism and Democratic education as the basis of analyzing concepts of learning rooted in school practices.

UNIT- IV Principles of Curriculum construction

1. Meaning and need of Curriculum.
2. Principles of Curriculum construction
3. Differentiation between curriculum framework, Curriculum and Syllabus.
4. Determinates of Curriculum
5. Social-Political-cultural-economic diversity.
6. Socio-Political aspirations including ideologies.
7. Economic necessities and Technological possibilities.
8. National priorities and International contexts.
9. Considerations in curriculum making.
10. Relevance and specificity of educational objectives for concerned level.
11. Critical issues: Environmental concerns, Gender differences, Values and Social sensitivity.

UNIT –V Curriculum Development and its Implementation

1. Different approaches of curriculum development: Subject centered: Environmentalist (incorporating local concerns) Behaviorist ; Competency based, Learner centered and Constructivist
2. Role of external agencies in providing curriculum and pedagogic supports to teachers within schools; teacher"s role in transacting, developing and researching curriculum.
3. Operationalisation of curriculum into learning situations; selection and development of learning resources i.e. text books, teaching – learning materials and resources outside the school- local environment, community and media.
4. Process of Curriculum evaluation; Evolving assessment modes, need of model of Continuous Comprehensive Evaluation; Feedback from learners, teachers, community and administrators.

PRACTICUMS

Attempt any two of the following.

1. Report on analysis of operationalisation of Curriculum into learning situations in school and outside school in any one school.
2. Conduct a survey on feedback of curriculum from learners/ Teachers/ community and prepare a report.
3. Prepare a report of a group discussion conducted on „democratic ducation"/„multiculturalism" as the basis of analyzing school practices.
4. Prepare three activities to develop awareness about Environmental concerns, Gender ensitivity and Social Sensitivity (one on each issue).

Reference

1. Schilvest, W.H. (2012), Curriculum: prospective paradigm and possiilty.M.C MLLAN publication.
2. Hirst, Paul, H. Knowledge and the curriculum. Routledge publication.
3. Letha ram mohan (2009). Curriculum instrchon and evaluation. Agerwal publication, Agra.
4. Scolt, dand (2003). Curriculum studies: curriculum knowledge. Routledge falmes, m.y.
5. Kelly, AV. (2009). The curriculum: theory and practice sage publication Singapore.
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9. Sinha, S. (2000) Acquiring literacy in schools, seminar.
10. Sternberg, R.J. (2013). intelligence, competence, and expertise, in A.J. Elliot & C.S. Dweck (Eds), handbook of competence and motivation .
11. Tagore, R. (2003) Civilization and progress in crisis in civilization and other essays.: rupa &co. New Delhi.
12. Pathak, A (2013) Social implications of schooling: knowledge pedagogy and consciousness. Aakar books, New Delhi.

Course 34 - DRAMA AND ART IN EDUCATION

(Internal Assessment)

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

1. Understand the role of fine arts in enhancing the creative potentials of an individual;
2. Understand the concept and basics of different art forms (all the visual and performing arts);
3. Understand the significant implications for the role of art, music and drama in education, to nurture children"s creativity and aesthetic sensibilities through genuine exploration, experience and free expression;
4. Respond to the beauty in different Art forms;
5. Develop ability to appreciate the inherent rhythm, beauty and harmony in visual and performing art forms(specifically regional, traditional and classical art forms)
6. Enhance skills for integrating different Art forms across school curriculum at secondary level ;
7. Develop skill to create artistic pieces through waste materials;
8. Develop awareness regarding the rich cultural and artistic heritage of India and the specific regions;
9. Develop awareness regarding the role of arts and crafts in the society and day-to-day life situation;
10. Get acquainted with the life and work of the local artists/artistes;
11. Deepen understanding, appreciation and skills in one chosen medium through self work and evaluate self as an artist;
12. Develop the ability to use drama and other visual and performing art processes to generate new knowledge, understanding and perception of the world;
13. Get acquainted with the vast range of the regional and traditional art forms in the light of National Integration.
14. Gets an opportunity for self expression resulting in emotional harmony.
15. Communicate important social issues through drama.

COURSE CONTENT

Note : The entire course will be based on practical oriented.

UNIT - I: Visual Arts and Crafts

Experiencing visual and plastic resources and means of creative expression:

1. Exploration and Experimentation with different *„materials'* of two dimensional and three dimensional Visual Arts - such as lines, strokes, colours, shades, tones, textures etc. by rendering through pencil, charcoal, crayon and pastel, pen and ink, water, poster and acrylic colours, rangoli, alpana, and mandana materials, clay and metal scraps wire, thread, cloured papers, printed materials from magazines and news paper, cardboards and other available throw away materials.
2. Exploration, experimentation and expressing with different techniques of Visual Arts like Sketching; Drawing; Painting; Poster making; Chart making; Block and Stencil printing; Collage and Mosaic work with a variety of coloured papers and coloured printed pictures/ photographs from magazines and news papers; Clay modeling; Hanging mobiles and Stables; Paper cutting and folding, and other local crafts work etc.
3. Framing and displaying of Art works.

UNIT–II Performing Arts: Dance, Music, Theatre and Puppetry Performing arts: Music and Dance
Experiencing Rhythmic and Kinetic resources and means of creative expression through:
1. Exploration and Experimentation with the terms used in Music and Dance like-Nada, Swara (Shudha, Komal, Tivra), Saptak, Sargham, Mandra, Madhyama, Tar, Arohi Avarohi, Raga, Ragini, Laya, Maatra, Tal, Avartal, Mishra Sam Tal, Gati, Padghat, Classical, Regional and Folk forms of Music and Dance and other related elements.
2. Listening/viewing and exploring Regional Art forms of music and dance through live and recorded performances.

PAPER CODE-9674

Course 35 - OPTIONAL COURSE
1. HEALTH AND PHYSICAL EDUCATION

Objectives: On completion of the course the student teacher will be able to:
1. Develop Physical fitness.
2. Understand the concept, aims & objectives of Health & physical education.
3. Understand various communicable diseases
4. Understand and practice good posture, Balance diet, first aid
5. Understand the characteristics of hygienic environment along with contributing factors and its importance.
6. Understand the rules & regulations and develop skill of organizing different physical education activities.
7. Develop competencies in games & athletic events
8. Conduct tournaments, competitions & Athletic Meets.

COURSE CONTENTS

UNIT-I Health Education

1. Meaning, Concept, Aims & Objectives, School Health Programme. Nutrition & Balanced Diet Components of balanced diet, major sources & mal nutrition.

2. Posture Concept & values Postural deformities and their management.

3. Communicable diseases Mode, Control & Prevention Physical fitness & first aid Physical fitness meaning, elements & importance. First aid in the following- Wounds, cuts, Hammaerage, dislocation, fracture, bites of insects, sprain & strain.

UNIT-II Physical Education

1. Concept, definition, aims, objectives and importance. Its place in school programme. A suggestive physical education programme in an Indian school

UNIT-III Management & organization of different physical education activities.

1. Rules of important major games and sports. Methods of marking a standard track (400 m), Connected areas & their rules.

2. Organization, Management & administration of tournaments, intramurals, play day, health day, play centers and other similar activities. Organizing Indigenous games like Kho-Kho, Kabbadi, Malkham etc.Indian street games-Satoliya, Gilli–Danda, and Rumal Jhapatta etc.

3. Officiating, Coaching, fundamental skills & ground marking of any two major games.

SESSIONAL WORK

Any one of the following:

1. Organize games / sports / health activities during OAS/SUPW Camp

2. Conduct awareness programme on issue of social health

3. Prepare an exhibition / awareness rally/poster competition on health awareness in nearby schools.

4. Organize a programme on health & hygiene.

5. Organize intramurals.

REFERENCES

1. Educational Dimensions of Physical Education- V.KRISHANA MURTHY AND N. PRAMESHWARA RAM: Sterling Publishers Pvt. Ltd., New Delhi.

2. Rules of Games and sports – YMCA PUBLISHING HOUSE, Jai Singh Road, New Delhi-1

3. Physical Education and Health- Dr. A.K. Uppal, Dr. G.P. Gautam, Friends Publications, New Delhi.

4. Physical activities for Secondary School (T.IP.E. Kandivali Bombay-Sub).

5. Syllabus of Exercise for Primary and Middle Schools, Education Department, Govt. of Rajasthan.

6. Loyal : Sharirik Shiksha (Shakuntala Prakashan, Lucknow)

7. Health Education & Physical Education(2003) – Krishna Puri & Dr. Soti Shivendra Chandra, Surjeet
Publication; 7-K Kolhapur Road, Kamla Nagar, Delhi-110007.
8. Health Education and Physical Education Teaching, Dr. Veena Sharma & Onkar Singh Tyagi, Arihant Shiksha Prkashan 50, Pratap Nagar-II, Tonk Phatak, Jaipur.

2. GUIDANCE AND COUNSELLING

Objectives: On completion of this course the student will be able to:-

1. Understand the meaning, nature and scope of guidance.
2. Understand various types of guidance.
3. Develop skills in administrating and interpreting testing and non testing tools of data collection.
4. Know and use the information and methods of guidance programme of special learners.
5. Understand with the meaning, nature and techniques of counselling.
6. Develop/learn the skills to organize guidance programme in the secondary schools.

COURSE CONTENTS

UNIT-1 Introduction to Guidance and Counselling

1. Meaning, Purpose, Scope, Nature and Functions of Guidance.
2. Need of Guidance at various stages
3. Principles of Guidance
4. Types of Guidance: Educational, Vocational and Personal guidance (Their Meaning, Objectives, needs and Importance)
5. Guidance services: Need and Importance
6. Types of Guidance Service, Individual inventory service, Information Service, Counselling Service,

Follow up service.

UNIT-2 Guidance Programme, Services and Procedures

1. Individual and group procedure of guidance and counselling.
2. Characteristic of good guidance programme.
3. Group guidance Techniques, Class-talks, Career Talks, Career Conference, Group discussion, Career exhibitions, Audio-Visuals Techniques.
4. Role of various community Agencies in school guidance progrmme.
5. Out line of minimum guidance programme at secondary on senior secondary level.
6. Meaning of Nature of Counselling and Role of Teachers as a Counsellor

UNIT-3 Guidance for special learner and Tools and Techniques

1. Concept of special learner Guidance needs of special learner

2. Guidance methods for

3. Special learner

4. Case study method

5. Remedial measures

6. Tools and Techniques

7. Types of tools

8. Standardized and self made tools

9. Techniques; Interview; Observation; Rating Scale & Check List

10. Sources of Collecting data

11. Cumulative record card

12. Anecdotal record card

13. Autobiography

PRACTICUM/SESSIONAL WORK

Any one of the following:-

1. Group Guidance – One career talk

2. Critical study of guidance programme in any senior secondary school.

3. Survey of Guidance needs of Adolescents

4. Celebration of Career day ensuring participation of all

SUGGESTED READING

1. Aggrawal, J.C. (2004). Educational Vocational Guidance and Counselling, Delhi : Daaba House

2. Asch, M. (2000). Principles of Guidance and Counselling, New Delhi: Sarup and Sons

3. Bhatia K.K. (2002). Principles of Guidance and Counselling, Ludhiana: Kalyan Publishers.

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10. Jones, J.A. (1970) : Principles of Guidance, Tata Mcgraw Hill, Bombay

11. Kocher, S.K. (2007). Educational Guidnace and Counselling, New Delhi: Sterling

12. Myres, (2005). Principles and Techniques of Vocational Guidance, New York: McGraw Hill

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15. NCERT (2008): Counselling Process and Strategies (Moule-2) New Delhi: NCERT
16. NCERT (2008). Guidance for human developments and Adjustment (Module-3). New Delhi: NCERT
17. NCERT (2008). Introduction to Guidance (Module-1) New Delhi: NCERT
18. Pandey, K.P. (2000): Educational and Vocational Guidance in India, Vishila Vidyalaya Prakashan, Varanasi
19. Robinson (2005). Principles and Procedures in Student Counselling, New York: Harper & Row
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23. Taxler, A.E. (1964): Techniques of Guidance, McGraw Hill, New York.
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3. PEACE EDUCATION

Objectives: On completion of this course the student will be able to-

1. Explain about peace and peace education, their relevance and connection to inner harmony as well as harmony in social relationships.
2. Understand the views of different philosophies about peace.
3. Understand importance of Peace and factors responsible for disturbing peace.
4. Understand and resolve conflicts within self and in society.
5. Use pedagogical skills and strategies in and out of classroom for promoting peace.

COURSE CONTENT

UNIT-I Understanding peace as a dynamic Social reality

1. Concept, Need and importance of peace education.
2. Peace values vis-a-vis constitutional values : Importance of the attitudes, beliefs and values of peace viz compassion, cooperation, love etc. that foster inner peace and constitutional values of justice , equality, freedom, respect for differences and ecological resources that ensure peace in society.
3. Challenges to peace by increasing stresses, conflicts crimes, terrorism, violence and wars resulting in poor equality of life.

4. Nature and causes of conflicts.

5. Conflicts at different levels in society: With himself, interpersonal, intrapersonal, organizational, interstate and global.

6. Role of Social and Ecological condition and processes that sustain conflict: limited resources, poverty, political interest, economic interest, socio-cultural and ecological conditions, environmental resources viz. water, mineral, forests, energy etc.

UNIT-II Role of various thinkers and agencies in promoting peace

1. Concept of Peace according to the following thinkers - Gandhi, Krishnamurthy, Aurbindo, Vivekananda, Rabindranath Tagore, Gijubhai Badheko, Mother Terasa initiatives at National and International levels.

2. Agencies contributing to peace – UNESCO, Gandhi Peace Foundation etc.

UNIT-lll Empowerment of Self

Awareness of the influence of Social milieu on self Understanding adequate self as a product of positive experiences of caring, warmth and appreciation in the family, school, neighborhood, etc. which promote healthy discipline, shunning violence.

1. Negative experiences generate stress, anger, aggressor

2. Yoga, meditation, anger/stress management, as practices that restore positive physical healthy and attitudes.

3. Role of different subjects in inculcation of PEACE.

4. Suggested Activities in schools for promoting peace.

a. Celebration of Festivals of different religions/ important days

b. Exposure to personalities working or fostering peace in society.

c. Practice of Yoga & Meditation.

d. Peace Rallies

5. Intervention in resolution of societal conflicts.

PRACTICUM/SESSIONAL

Any one of the following:-

1. Visits to organizations connected with peace and inter cultural harmony and aesthetic appreciation to experience peace as reality submission of reports on experiences.

2. Analysis of morning assembly programme of a school from the point of peace.

3. Preparation of a report on school programmes for promoting to Peace.

4. Case study of a child suffering from bad habit.

5. Developing an action plan for Peace in school and local community.

REFERENCE

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Kreidler Willam, I, (1991) Creative Conflict Resolution more than 200 activities for keeping pace in the classroom, Foreman, Scott, Glenview.
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PAPER CODE-9675

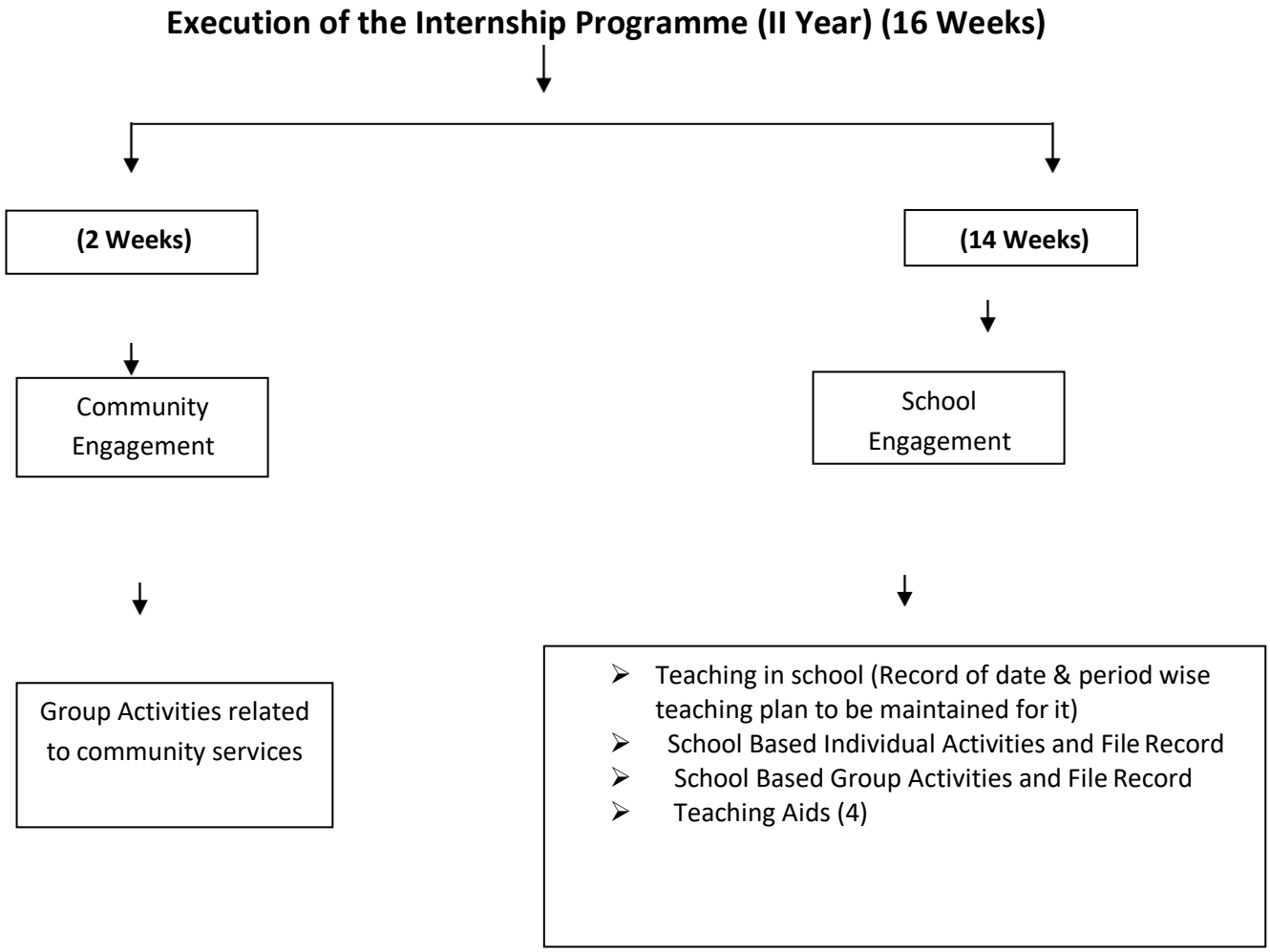
Course 36 - INTERNSHIP PROGRAMME (School Internship Phase-II)

School Internship is designed to lead to the development of broad repertoire of perspectives, professional capacities, teacher dispositions, sensibilities and skills. During the internship, a student-teacher shall work as a regular teacher and participate in all the school activities, including planning, teaching and assessment, interacting with school teachers, community members and children.

Objectives: After completion of the Internship the student - teachers will be able to –

1. Develop the understanding of the school and its management.
2. Develop the ability to plan and manage the class-room teaching.
3. Develop the sensibility towards diverse needs of learners in school.
4. Develop ability to discharge various responsibilities expected from a teacher.
5. Organize and conduct the co- curricular activities.
6. Get acquainted with various school records maintained by the school.
7. Maintain records expected from a teacher.
8. Develop skills of conducting community contact programmes.
9. Get acquainted with the functioning of SMC.

As per the School Internship: Framework and Guidelines (Jan., 2016) of the NCTE Regulations, 2014, following revised plan of the School Internship is proposed for the consideration of the committee.



During the 14 weeks period of internship in schools, the student-teachers will perform the under mentioned tasks:-

1) Interact with Headmaster and mentor teachers of the school about the two teaching Subjects he/she has offered.

2) They will teach at least 3-4 periods per day (Minimum of 200 lessons).

3) They will have to discharge the duties of a class- teacher of any class.

4) They will have to participate in the following activities individually as well as in group. The suggested individual and the group activities are as follows:-

A) <u>Individual Activity</u>

1. Preparation of time table of the school other than that in force.
2. Maintaining students' attendance and preparing a monthly record of students' attendance.
3. Maintaining Teacher's diary.
4. Case study of a special child.
5. A critical study and report of Institutional plan of the school.
6. Preparation of a progress report of a student of the class of which he /she is the Class teacher.
7. Analysis of school syllabus and textbooks of their pedagogy subjects.
8. Undertaking of Action Research Project on at least one problem area of Schooling.

B) <u>Group Activity</u>

1. Organising Morning Assembly
2. Organising Literary and Cultural Activities
3. Organising Games and Sports Activities

4. Participation in Parent's-Teacher Meeting and Meeting of School Management Committee (SMC)
5. Observing and participating in Mid-day Meal Programme
6. Organising Science Club or other Club Activities
7. Maintaining discipline in the school.
8. Participating in Community Contact Programmes like- Rallies, awareness Campaigns, community health campaigns, cleanliness campaigns and so on.

NOTE: - From group activities (1) to (7), each student- teacher has to participate in at least 5 of the activities and activity no. (8) Is compulsory for all student-teachers

5) Study of various records maintained by the school (for instance, stock register, service book, letter receipt & dispatch register, Library book accession & issue register, scholar register, leave account, T.A. bill etc.)

NOTE: - Each student - teacher has to submit a file in which detailed reports of all the activities and tasks observed and discharged by him/her are to be mentioned along with reflective thinking. A viva- voce will be conducted after the internship programme. The file record, the viva-voce and the lesson plan diary will form the basis of assessment of the internship programme. The student-teachers performance shall be assessed jointly by the TEI Principal and faculty (The grade recommended for a particular student by the Principal and mentor teachers of internship school must also be considered.)

Evaluation for Internship Programme

Evaluation for internship programme will consist of two parts – Internal Evaluation & External Evaluation, the details of which are as follows:

INTERNAL EVALUATION		
1	Teaching in Schools (Record of date and period wise teaching plan to be maintained for it.	100
2	Individual Activities and File Record	80
3	Group Activities and File Record	30
4	Teaching Aid (4)	20
5	Community Engagement and Report writing	20
	Total Marks	**250**
	EXTERNAL EVALUATION	
1.	Viva-Voce for Internship Programme (50 marks) Written test based on internship (50 marks) Power point presentation and documentation of internship (50 marks)	150
	Total Marks	**400**

Note:-

1. The grand total for the internship programme of both the years is 550 marks (150+400)
2. The weightage of external evaluation (Viva-voce for II Year) of internship will be 150 marks.
3. During the viva- voce, student will present all the records of the work done during the internship (II Year) programme viz. teaching in school, individual and group activities.
4. Power point presentation (including videos of various activities) of the work done by the students during the second year of internship is desirable at the time of viva-voce.

The Board of examiners for Viva-voce will consist of:

a) The Principal of the college concerned.

b) One senior member of the college. (Preferably Internship Incharge)

c) Two external members appointed by the university.