

## Student's Responsibilities of Learning

Appreciate the institutional goals and objectives and contribute to their realisation by participating in relevant institutional activities.

Have a clear knowledge of the programmes, admission policies, rules and regulations of the institution.

Understand the teaching-learning strategies and evaluation systems of the institution.

Follow the time schedules, rules and regulations of the institution.

Undertake regular and intense study of learning materials.

Make optimum use of the learning resources and other support services available in the institution.

Prepare for continuous internal assignments and term-end examinations.

Give feedback for system improvement.

Have faith and ability to pursue life-long learning.

Live as worthy alumni of the institution.

॥ सरस्वतीं देवयन्तो हवन्ते ॥

Janardan Rai Nagar Rajasthan Vidyapeeth  
**Lokmanya Tilak Teachers Training College (CTE)**

(Accredited 'A' Grade by National Assessment and Accreditation Council)

Dabok, Udaipur - 313022

Tel. : (0294) 2655327

Email : dabok2013@gmail.com



**Faculty of Education**  
**Bachelor of Education (B.A. B.Ed./B.Sc. B.Ed.)**  
**Integrated Course**

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**Janardan Rai Nagar Rajasthan Vidyapeeth  
(Deemed) University**

(Accredited 'A' Grade by National Assessment and Accreditation Council)

# **SYLLABUS**

For

**B.A. B.Ed. / B.Sc. B.Ed.  
Integrated Course**



**(I Year)**

**Lokmanya Tilak Teachers Training College (CTE)**

Dabok, Udaipur - 313022 Tel. : (0294) 2655327

## MISSION

**The Mission of the institute is to develop Lokmanya, Value Oriented, Dynamic Prospective teachers who can serve efficiently at all levels of school education through inside and outside classroom activities in different social situations.**

## GOALS

- 1. To prepare competent and committed school teachers.**
- 2. To develop sense of social responsibility in would be teachers.**
- 3. To impart skills of working with community.**
- 4. To impart education and skill to prepare teachers who can efficiently take the responsibility of developing cognitive conative and psychomotor aspects of the personality of school students.**

## RULES AND GUIDELINES

### B.A. B.Ed. / B.Sc. B.Ed. Integrated Course

#### OBJECTIVES :

The main objective of this programme is to prepare teachers for Secondary (Classes IX-X) & Senior Secondary (Classes XI-XII) schools.

The B.A. B.Ed. / B.Sc. B.Ed. programme enables student teacher to -

- Acquire competence to teach subjects of his/her specialization on the basis of accepted principles of learning and teaching in the context of NCF 2005 and NCFTE 2009.
- Develop skills, understanding, interests and attitude which enable him/her to foster all-round growth and development of the children under his/her care.
- Develop skills in identifying, selecting, innovating and organizing learning experiences for teaching the required subjects.
- Develop understanding of psychological principles of 'growth and development', 'individual differences and similarities' and 'cognitive and affective learning'.
- Develop skills of guidance and counselling to solve students personal as well as academic problems.
- Understand the role of the home, the peer group and the community in shaping the personality of the child and help to develop an amicable home-school relationship for mutual benefit.
- Understand the role of school and community in changing society.
- Contribute to fill up the gap between theory and practice by dovetailing both appropriately.
- Acquire interactive processes of group reflection, critical thinking and concept formation.
- Understand the nature, purpose, influencing factors and

problems of various levels of education in the context of diverse socio-cultural-political & multilingual Indian society and resolve them.

- Plan and organize classroom instruction through learner centered techniques for inclusive education.
- Conduct pedagogical content analysis in subject areas and use it for facilitating learning in the classroom.
- Effective utilization of Information Communication Technology resources, online as well as offline for day-to-day classroom teaching, remedial instruction and providing challenging learning to the gifted.
- Develop critical understanding of ICT in Education.
- Develop professional commitment and work as responsible professional.
- Cultivate reflective teaching practices and interface with societal resources.

#### **EDU. R-1 : ADMISSION**

- (b) Eligibility criteria for admission to B.A. B.Ed. / B.Sc. B.Ed. programme in Janardan Rai Nagar Rajasthan Vidyapeeth (Deemed) University, Udaipur will be according to the qualifications and norms laid down by NCTE/UGC/ Government of Rajasthan from time to time.
- (c) **Reservation** : Reservation of seats for SC/ST/OBC and Handicapped will be as per existing Rajasthan Govt.
- (d) **Procedure** : Admission shall be made on the basis of entrance examination (4 Year Pre B.A. B.Ed. / B.Sc. B.Ed.)

#### **EDU. R-2 : DURATION AND WORKING DAYS**

B.A. B.Ed. / B.Sc. B.Ed. programme is a **full time course** and consists of four years as shown in programme structure.

- (a) **Duration** : The B.A. B.Ed. / B.Sc. B.Ed. Programme shall be of a duration of four Academic Years, which can be completed in a maximum of five Years from the date of the admission to the programme.

- (b) **Working Days** : There shall be at least **Two Hundred Working Days each year** excluding of the period of examination. Institution shall work for a minimum of **Thirty six hours a week**, during which physical presence in the institution of all the student teachers is necessary to ensure their availability for advice, guidance, dialogue and consultation as and when needed.

#### **EDU. R-3 : ATTENDANCE :**

- (a) The minimum attendance of student teachers shall have to be 80% for all theory and supervised learning classes, and 90% for school internship.
- (b) It is mandatory for every student to keep 80% of attendance in the College. Principal may condone the attendance of any student not more than 10% of total attendance to be kept by the student for a genuine and valid reason. In case of serious illness or under extraordinary circumstances, on recommendation of the Principal, the executive council shall decide to condone the required attendance of any student. Further provided that, any student participating in sports/cultural activities to represent the college/the university at university/district/state/national level the principal shall condone these days as attendance for want of completion of the required attendance by the institute.

#### **EDU. R-4 : SCHOOL INTERNSHIP**

- (a) The student teachers will be actually placed in a school for a duration of four and sixteen weeks, in third and fourth year respectively.
- (b) Student teachers will function in liaison with the regular teachers in the school in all day-to-day functioning along with teaching learning.
- (c) Pre-internship will be held for two weeks in which school observation, orientation of subject specific skills, Pre-view of Text-books and development of teaching learning material will be done.

- (d) In third year students will have to go for 4 week internship in school in which lesson plans based on different methods and approaches (fusion based) will be developed and teaching in original conditions will be organized.
- (e) In the fourth year, students will have go for 'School Internship' of sixteen weeks. It is desirable that student teacher will be provided internship in upper-primary or secondary/higher secondary schools. During this period, their role in the school is something like an 'apprentice' and its specific contours need to be worked out by course faculty. They will be engaged in the school functioning in all its aspects.

#### **EDU. R-5 : TEACHING PRACTICE :**

- (a) Student Teachers will to deliver two lessons per day. Teaching practice will be conducted under the supervision of a member of the teaching staff of the College OR Head Master / Principal of upper Primary/Secondary/Senior Secondary Schools OR Senior Teacher of Upper Primary/ Secondary /Senior Secondary Schools.
- (b) Student, teacher should use all available audio-visual equipments in his/her lessons.
- (c) Science student teacher has to demonstrate two science experiments related to school syllabus during the practical lessons in the practicing schools.
- (d) A student teacher has to prepare and deliver two digital lessons during the programme.

#### **Edu. R-6 : Examination :**

- (a) The examination for Year I to Year IV of the B.A. B.Ed. / B.Sc. B.Ed. programme shall consist of Theory and Practical (Both internal and External) Examination.
- (b) Student teacher will not be permitted to appear for Final Lesson exam in Year IV unless they produce a completion certificate of practical work done to the satisfaction of the Head of the

Education College or B.A. B.Ed. / B.Sc. B.Ed. Department of Janardan Rai Nagar Rajasthan Vidyapeeth University.

- (c) In Final Lesson examination, student teachers will be tested in their practical skills of class management and teaching the one subject of their choice.
- (d) For Engagement with Field activities, student teacher **has to conduct different activities** [i.e. (1) Seminar / Workshop / Group Discussion / Quiz., (2) Library Engagement / Laboratory Engagement, (3) Social Engagement / Community Engagement, (4) Observation / Case Study / Research / ICT / Resource Generation / Any Other.

## B.A. B.Ed / B.Sc. B.Ed. COURSE STRUCTURE

COURSE CODE	I YEAR	COURSE TYPE	MAX. MARKS ARTS	MAX. MARKS SCIENCE
5001-1	LANGUAGE AND COMMUNICATION	LP	100	100
5002-1	CONTEMPORARY INDIA AND EDUCATION	PE	100	100
5003-1	TEACHING AND LEARNING	PE	100	100
	ANY THREE FROM THE FOLLOWING:	SS		
	<b>ARTS</b>			
5004-A1	-ENGLISH LITERATURE (I, II)		200	
5004-A2	-HINDI LITERATURE (I, II)		200	
5004-A3	-SANSKRIT LITERATURE (I, II)		200	
5004-A4	-HISTORY (I, II)			
5004-A5	-POLITICAL SCIENCE (I, II)			
5004-A6	-GEOGRAPHY (I, II)			
5004-A7	-ECONOMICS (I, II)			
5004-A8	-SOCIOLOGY (I, II)			
	<b>SCIENCE</b>			
5004-A9	-PHYSICS (I, II, III)			300
5004-A10	-CHEMISTRY (I, II, III)			300
5004-A11	-MATHEMATICS (I, II, III)			300
5004-A12	-COMPUTER SCIENCE (I, II, III)			
5004-A13	-BOTANY (I, II, III)			
5004-A14	-ZOOLOGY (I, II, III)			
5005-1	CULTURAL AND LITERARY ACTIVITIES I	VAC	50	50
5006-1	MEDITATION, YOGA AND SPORTS I	VAC	50	50
	TOTAL MARKS		1000	1300

## B.A. B.Ed / B.Sc. B.Ed. COURSE STRUCTURE

COURSE CODE	II YEAR	COURSE TYPE	MAX MARKS ARTS	MAX MARKS SCIENCE
5001-2	KNOWLEDGE AND CURRICULUM	PE	100	100
5002-2	EDUCATIONAL TECHNOLOGY	PE	100	100
5003-2	ASSESSMENT FOR LEARNING	PE	100	100
	ANY THREE FROM THE FOLLOWING:	SS		
	<b>ARTS</b>			
5004-B1	-ENGLISH LITERATURE (I, II)		200	
5004-B2	-HINDI LITERATURE (I, II)		200	
5004-B3	-SANSKRIT LITERATURE (I, II)		200	
5004-B4	-HISTORY (I, II)			
5004-B5	-POLITICAL SCIENCE (I, II)			
5004-B6	-GEOGRAPHY (I, II)			
5004-B7	-ECONOMICS (I, II)			
5004-B8	-SOCIOLOGY (I, II)			
	<b>SCIENCE</b>			
5004-B9	-PHYSICS (I, II, III)			300
5004-B10	-CHEMISTRY (I, II, III)			300
5004-B11	-MATHEMATICS (I, II, III)			300
5004-B12	-COMPUTER SCIENCE (I, II, III)			
5004-B13	-BOTANY (I, II, III)			
5004-B14	-ZOOLOGY (I, II, III)			
5005-2	CULTURAL AND LITERARY ACTIVITIES II	VAC	50	50
5006-2	MEDITATION, YOGA AND SPORTS II	VAC	50	50
	TOTAL MARKS		1000	1300

## B.A. B.Ed / B.Sc. B.Ed. COURSE STRUCTURE

COURSE CODE	III YEAR	COURSE TYPE	MAX MARKS ARTS	MAX MARKS SCIENCE
5001-3	PEDAGOGY OF SCHOOL SUBJECT I	PE	100	100
5002-3	PEDAGOGY OF SCHOOL SUBJECT II	PE	100	100
5003-3-1	PRE INTERNSHIP	PE	25	25
5003-3-2	INTERNSHIP I	PE	75	75
5004-C1 5004-C2 5004-C3 5004-C4 5004-C5 5004-C6 5004-C7 5004-C8	ANY THREE FROM THE FOLLOWING: <b>ARTS</b> -ENGLISH LITERATURE (I, II) -HINDI LITERATURE (I, II) -SANSKRIT LITERATURE (I, II) -HISTORY (I, II) -POLITICAL SCIENCE (I, II) -GEOGRAPHY (I, II) -ECONOMICS (I, II) -SOCIOLOGY (I, II)	SS	200 200 200	
5004-C9 5004-C10 5004-C11 5004-C12 5004-C13 5004-C14	<b>SCIENCE</b> -PHYSICS (I, II, III) -CHEMISTRY (I, II, III) -MATHEMATICS (I, II, III) -COMPUTER SCIENCE (I, II, III) -BOTNY (I, II, III) -ZOOLOGY (I, II, III)			300 300 300
5005-3	CULTURAL AND LITERARY ACTIVITIES III	VAC	50	50
5006-3	MEDITATION, YOGA AND SPORTS III	VAC	50	50
	TOTAL MARKS		1000	1300

## B.A. B.Ed / B.Sc. B.Ed. COURSE STRUCTURE

COURSE CODE	IV YEAR	COURSE TYPE	MAX MARKS ARTS	MAX MARKS SCIENCE
5001-4	SCHOOL ORGANIZATION AND ADMINISTRATION	PE	100	100
5002-4	UNDERSTANDING THE SELF	PE	100	100
5007-4	CRITICAL AND CREATIVE THINKING	PE	100	100
5008-4	DRAMA, ART AND AESTHETICS	PE	100	100
5009-4	COMPULSARY ENGLISH	PE	100	100
50010-4	ENVIRONMENTAL EDUCATION	PE	100	100
5003-3-3	INTERNSHIP II (16 WEEKS)	PE	300	300
5011-4	WORKING WITH COMMUNITY AND OUTREACH	VAC	100	100
5005-4	CULTURAL AND LITERARY ACTIVITIES IV	VAC	50	50
5006-4	MEDITATION, YOGA AND SPORTS IV	VAC	50	50
	TOTAL MARKS		1000	1000

### ABBREVIATIONS

LP	=	LANGUAGE PROFICIENCY
PE	=	PROFESSIONAL EDUCATION
SS	=	SUBJECT SPECIALIZATION
VAC	=	VALUE ADDED COURSE

**EVALUATION SCHEME FOR  
B.A.B.Ed./B.Sc.B.Ed. INTEGRATED COURSE**

S.NO.	COURSE CODE	COURSE NAME	COURSE TYPE	MARKING
1	5001-1	LANGUAGE AND COMMUNICATION	LP	TOTAL MARKS -100 EXTERNAL-50(THEORY PAPER) INTERNAL-50 (DAILY PRESENTATION -20 FINAL PRESENTATION -20 ACTIVITY FILE SUBMISSION-10)
2	5002-1	CONTEMPORARY INDIA AND EDUCATION	PE	TOTAL MARKS -100 EXTERNAL-75(THEORY PAPER) INTERNAL-25 (PRE UNIVERSITY TEST-15 ASSIGNMENT SUBMISSION-10)
3	5003-1	TEACHING AND LEARNING	PE	TOTAL MARKS -100 EXTERNAL-75(THEORY PAPER) INTERNAL-25 (PRE UNIVERSITY TEST-15 ASSIGNMENT SUBMISSION-10)
4	5004-A1 5004-A2 5004-A3 5004-A4 5004-A5 5004-A6 5004-A7 5004-A8	<b>ARTS</b> -ENGLISH LITERATURE(I,II) -HINDI LITERATURE(I,II) -SAMSKRIT LITERATURE(I,II) -HISTORY(I,II) -POLITICAL SCIENCE(I,II) -GEOGRAPHY(I,II) -ECONOMICS(I,II) -SOCIOLOGY(I,II)	SS	TOTAL MARKS -100(PER PAPER EXCEPT GEOGRAPHY) EXTERNAL-75 INTERNAL-25 (PRE UNIVERSITY TEST-15 ASSIGNMENT SUBMISSION-10)  FOR GEOGRAPHY TOTAL MARKS -100 EXTERNAL-60(THEORY PAPER) PRE UNIVERSITY TEST-15 PRACTICAL-25
	5004-A9 5004-A10 5004-A11 5004-A12 5004-A13 5004-A14	<b>SCIENCE</b> -PHYSICS(I,II,III) -CHEMISTRY(I,II,III) -MATHEMATICS (I,II,III) -COMPUTER(I,II,III) -BOTANY(I,II,III) ZOOLOGY (I,II,III)		TOTAL MARKS -100(PER PAPER EXCEPT MATHEMATICS ) EXTERNAL-60 (THEORY PAPER EXCEPT MATHEMATICS ) INTERNAL- PRE UNIVERSITY TEST-15 PRACTICAL-25 (PER PAPER EXCEPT MATHEMATICS )  FOR MATHEMATICS TOTAL MARKS -100 (PER PAPER) EXTERNAL-75 (THEORY PAPER) INTERNAL-25 (PRE UNIVERSITY TEST-15 ASSIGNMENT SUBMISSION-10)

# FIRST YEAR

## LANGUAGE AND COMMUNICATION

Course Code 5001-1

### OBJECTIVES

- Students will be able to understand the concept of language.
- Knows of language and components of language.
- Understand the concept of listening and speaking skills.
- Understand the importance of classroom discourse and questioning for communication. Understand the concept of three language formula in Indian education system.
- Understand the language diversity.
- Understand home language and school language.
- Understand the concept of reading and writing skills.
- Develop multicultural awareness and use multilingualism while communication.
- Develop writing skills and understand written communication modes.

### UNIT - I NATURE OF LANGUAGE AND ITS FUNCTIONS

- 1.1 Concept of Language
- 1.2 Characteristics of Language
- 1.3 Language functions
- 1.4 Components of Language: sound (phoneme)/ letter, word and sentence
- 1.5 Concept of three language formula in Indian education system
- 1.6 Concept of Mother tongue, First language, Second language, Third language, Foreign language
- 1.7 Language diversity with reference to dialects regional languages
- 1.8 Home language and school language

### UNIT - II LISTENING AND SPEAKING

#### Listening

- 2.1 Listening comprehension
- 2.2 Sub-skills of listening
- 2.3 Strategies to enhance listening skills

#### Speaking

- 2.4 Importance of pronunciation
- 2.5 Reasons of faulty pronunciation
- 2.6 Strategies to enhance speaking skills (Group work, Pair work, interview, GD etc.)

### UNIT - III READING AND WRITING

#### Reading

- 3.1 Reading comprehension
- 3.2 The sub-skills of reading
- 3.3 Reading strategies (note taking, summarizing, interpretation, central idea)
- 3.4 Strategies to enhance reading skills

#### Writing

- 3.5 Purpose and process of writing
- 3.6 Sub-skills of writing
- 3.7 Elements of effective writing
- 3.8 Writing fundamentals: spelling, punctuation, word choice, grammar
- 3.9 Strategies to enhance writing skills

### UNIT - IV : COMMUNICATION

- 4.1 Concept, process and types of communication
- 4.2 Verbal communication: ability to speak fluently; negotiating a point of view; organized, logical and sequential presentation; interview skills

- 4.3 Use of communication skills (gestures, emotions, facial expression, expression, posture and movements)
- 4.4 Role of teacher in resolution of speech defects (lipsing , stuttering, stammering)

### **UNIT - V ORAL AND WRITTEN COMMUNICATION**

- 5.1 Classroom discourse
- 5.2 Oral language in classroom
- 5.3 Questioning in classroom
- 5.4 Discussion as a tool for good communication
- 5.5 Writing letters
- 5.6 Writing reports
- 5.7 Writing notices
- 5.8 Writing dialogues

### **TRANSACTION MODE**

Lecture -cum-discussion, using language in context, interactive session, materials to be chosen from newspapers, magazines and journals. Use of dictionaries and encyclopedia, library work.

### **ASSIGNMENTS**

#### SUGGESTED ACTIVITIES FOR VERBAL AND WRITTEN COMMUNICATION

- Organization of prayer and assembly
- Instructions in assembly for different activities
- Negotiating a point of view - learning to talk persuasively so as to get across one's perspective.
- Debating on an issue - agreeing / disagreeing.
- Politeness competitions- students with partners take turns in using a given number of utterances for negotiation / requests/complaints/small talk.
- Students introduce themselves though using symbols/ metaphors.

- Students collect newspaper/magazine cuttings on topical and/ or cultural issues of interest-write and share their opinion with peers.
- Group Discussion : round-table symposium - panel - lecture forum
- Conversation: styles of conversation - formats of conversation - telephonic conversation, Students discuss and prepare interview schedules. Organization of mock interviews.
- Drafting different types of letters-E mails, going through the letters of famous people.
- Essay writing- types of essays (literary, scientific etc) - going through the model essays.
- Writing dialogues
- Writing poems
- Writing paragraphs
- Resume writing
- Book Reviewing
- Comments in notebook/result sheet of students
- Script writing
- Students read sample advertisements from magazines. Discuss in groups and then prepare their own advertisement.
- Editing literary pieces in groups and then re-editing what has been edited by other groups after discussion

### **SUGGESTED READINGS**

1. Agnihotri, R.K. (1995). Multilingualism as a classroom resource. In K. Heugh, A Siegruhn, & P. Pluddemann (Eds.) Multilingual education for South Africa 9pp. 3-&). Heinemann Educational Books.
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 Schools: Based readers and Content texts. Psychology Press.

3. Grellet, f. (1981). Developing reading skills: A practical Guide to reading comprehension exercises. Cambridge University Press.
4. Ladson-Billings. G. (1995). Toward a Theory of Culturally Relevant Pedagogy. American Educational research journal.
5. NCERT. (2006d) Position Paper National Focus Group on teaching of Indian language (NCF- 2005). New Delhi: NCERT.
6. Thwaite, A. & Rivalland, J.(2009) How can analysis of classroom Tasks help teachers reflect on their practices? Australian Journal of Language and Literacy.

## **CONTEMPORARY INDIA AND EDUCATION**

**Course Code 5002-1**

### **OBJECTIVES**

1. To know concept, aims and objectives of Education.
2. To know the concept of social diversity and role of education.
3. To understand the constitutional values and fundamental rights, duties and directive principles.
4. To know constitutional provisions about education.
5. To introduce pupil-teachers to basic concepts of inequality, discrimination and marginalization.
6. To acquaint pupil-teacher various emerging trends in education like RTE, UEE, USE etc.
7. To introduce pupil-teachers by different agencies and programmes for universalization of education like S.S.A., RMSA, NCF-2005 etc
8. Concept of Socialization, Social change, Social Stratification, Social Status and Modernization.
9. To acquaint pupil-teachers with emerging global concerns and education.

### **UNIT - I : EDUCATION AND SOCIAL DIVERSITY**

- 1.1 Concept of Education.
- 1.2 Aims and objectives of education (According to Kothari Commission and National Policy .1986)
- 1.3 Forms of Education.
- 1.4 Concept, Types and levels of Social Diversity.
- 1.5 Enrichment of Social Diversity through Education for Universalization.

## **UNIT-II : CONSTITUTIONAL VALUES AND INITIATIVES IN EDUCATION**

- 2.1 Constitutional Values With Reference to Directive Principles, Fundamental Duties and Rights.
- 2.2 Constitutional provisions on Education in India.
- 2.3 Concept of Universal Education (UEE & USE) obstacles and solutions.
- 2.4 Introduction, Functions and contribution of Madhyamik Shiksha Abhiyan (RMSA).
- 2.5 Skill development initiatives in India, problem and prospects.

## **UNIT-III : STUDY OF EDUCATIONAL COMMISSIONS AND POLICES OF GOVERNMENT**

- 3.1 Right to education 2009 and role of education in implementation of RTE 2009.
- 3.2 Salient features INCF 2005.
- 3.3 New Education Policy 1986.
- 3.4 Dalor's Commission in the light of four pillars.
- 3.5 Technology and Innovative Policy 2013 (STI-2013).

## **UNIT-IV : INDIAN SOCIETY AND EDUCATION**

- 4.1 Concept of Socialization and role of educational in Socialization process.
- 4.2 Concept of Social change, factors affecting social change, planned change and Teacher as an agent of social change
- 4.3 Concept of Social Stratification, Social Status and Provisions of equal opportunity in Education
- 4.4 Concept of Modernization and Role of Education in Modernizations

## **UNIT-V: EMERGING GLOBAL CONCERN AND EDUCATION**

- 5.1 Education for peace, Issues of National and International conflicts, social injustice, communal conflicts.
- 5.2 Role of teacher in peace building environment.

- 5.3 Education for environment Conservation: Social and global.
- 5.4 Inclusive education, Problems solutions and role of teachers in its implementation.
- 5.5 Concept of Gender Sensitivity, Gender Equality and role of education in developing Gender Sensitivity and Equality.

## **ASSIGNMENTS (ANY ONE)**

1. A survey of awareness about constitutional values in secondary level students.
2. Prepare power point presentation on any sub-unit of syllabus.
3. Write a monograph on any sub unit of syllabus.
4. Write a term paper on any National document related to Education.
5. Group discussion on any topic of global concern and prepare report on it.

## **SUGGESTED READINGS**

1. Anord, C.L. et al. (1983) : Teacher Education in Emerging Indian Society, NCERT, New Delhi at least 30 students.
2. A.S. Balasooriya (2001) : Learning the Way of Peace, United Nations Educational, Scientific and Cultural Organization, New Delhi.
3. Govt. of India (1992) : Programme of Action (NPE) Ministry of HRD.
4. Mohanty, J. (1986) : School Education in Emerging Society. Sterling Publishers, McMillan, New Delhi.
5. Ministry of Education "Education Commission" 1964-1966. Education and National Development, Ministry of Education, Govt. of India, 1966.

## TEACHING AND LEARNING

Course Code 5003-1

### OBJECTIVES

1. To understand the concept, nature and scope of educational psychology.
2. To acquaint students with tools and techniques of measurement in Psychology.
3. To understand the concept of growth and development and stages of development with special reference to the stage of adolescence.
4. To know about the developmental characteristics.
5. To develop the skills of applying the principles of development in improving the teaching learning process.
6. To understand the concept nature of intelligence and know the theory related to it.
7. To understand the concept of learning and theories of learning
8. To understand the concept of personality.

### UNIT I - INTRODUCTION TO EDUCATIONAL PSYCHOLOGY

- 1.1 Concept, Nature and Scope of Educational Psychology.
- 1.2 Importance of knowledge of Psychology for Teachers.
- 1.3 Tools and Techniques of Measurement in Psychology.  
Questionnaire, Rating Scale, Interview, Observation and Check List.

### UNIT II - GROWTH AND DEVELOPMENT

- 2.1 Concept of growth and development
- 2.2 General characteristics of growth and development
- 2.3 Stages of growth and development
- 2.4 Factors affecting growth and development
- 2.5 Social Development; Physical Development and Emotional

Development of adolescent

### UNIT III - INTELLIGENCE

- 3.1 Concept and nature of intelligence.
- 3.2 Factor theory of intelligence ( Gardner's theory of Multiple Intelligence)
- 3.3 Measurement of intelligence (Verbal and non-verbal tests of intelligence)
- 3.4 Concept and dimensions of Emotional intelligence

### UNIT IV - LEARNING

- 4.1 Concept of learning, maturation and development .
- 4.2 Factors influencing Learning.
- 4.3 Theories of learning and their educational implications:
- 4.4 Trial and Error -Thorndike
- 4.5 Classical Conditioning-Pavlov
- 4.6 Operant Conditioning-Skinner
- 4.7 Transfer of learning: concept, types and applications

### UNIT V - DEVELOPMENT OF PERSONALITY

- 5.1 Concept of Personality, types and traits of personality
- 5.2 Factors affecting personality
- 5.3 Measurement of personality (Self-report and projective techniques)

### ASSIGNMENTS (ANY ONE)

- 1 Administration of one Psychological test
- 2 Observing the behavior of an adolescent boy/girl and listing his/her characteristics and problems.
- 3 Paper presentation on any sub unit of syllabus.

### SUGGESTED READINGS

1. Berk ,L. E ( 2006 ) Child development. Pearson and Allyn.
2. Chakraborty, U (2014) Bises Chahida Sampanna Shisu O Antarbhuktumulak Shiksha, Aaheli Publishers.

3. Chauhan S. S. (2004). Advanced educational psychology. New Delhi :Vikas Publishing House.
4. Ghosh, Arun: Shiksha? Shrai Monobigyan. Sengupta, Pramodbandhu & Sharma, Prasanta: Shikshamanobigyan.
5. Mangal, S. K. (2008).Advanced educational psychology. New Delhi : Prentice Hall of India.
6. Ray, Sushil. (2012). Shikshamanovidya.Kolkata : Soma Book Agency.
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**ARTS**

## ENGLISH LITERATURE - I

Course Code 5004-A1-I

### POETRY, DRAMA AND GRAMMAR

#### OBJECTIVES

- 1) This paper introduces the students to the major poets of English Literature as well as some of the Indian Poets.
- 2) It enables the students to understand the tradition of English Drama.
- 3) The students will acquire knowledge of English Grammar so that he is able to understand and describe the structure of English sentences.

#### UNIT-I

1. Parts of Speech
2. Basic Sentence Patterns

#### UNIT-II : POETRY (FOR DETAILED STUDY)

1. William Shakespeare :
  - 1) When to the Sessions
  - 2) Like as the Waves
2. John Milton :
  - 1) When the Assault was intended on the City
  - 2) On His Blindness
3. John Donne :
  - 1) Death be not Proud
  - 2) The Funeral

#### UNIT - III : POETRY (FOR DETAILED STUDY)

1. Alexander Pope :
  - 1) Solitude
  - 2) From an Essay on Man
2. William Blake : The Tiger
3. William Wordsworth :
  - 1) Solitary Reaper
  - 2) Ode to Duty

#### UNIT-IV : POETRY (FOR DETAILED STUDY)

1. John Keats :
  - 1) La Belle Dame Sans Merci
  - 2) Ode to a Nightingale
2. P.B. Shelley :
  - 1) The Cloud
  - 2) To a Skylark

#### UNIT-V : ONE-ACT PLAYS (FOR NON-DETAILED STUDY)

1. Fritz Karinthy : Refund
2. Norman Mckinnel : Bishop's Candlesticks

#### SUGGESTED READINGS

1. The Poets Pen : (ed.) PE. Dustoor and Hampi
2. A Golden Treasury : (ed.) VK. Gokak, Academy, New Delhi. Of Indo-Anglian Poetry
3. Selected One-Act Plays : Satya Narayan Singh, Mcmillian
4. A University Grammar : (ed) R.P.Bhatnagar, Rajul Bhargava of English
5. A High School English Grammar : PC, Wren and Martin

## ENGLISH LITERATURE - II

Course Code 5004-A1-II

### PROSE AND FICTION

#### OBJECTIVES

1. To acquaint the students with the genre of prose writing its characteristics and popular prose writers over the ages.
2. To familiarize the student with English and Indian fiction.

#### UNIT - I : SELECTED LITERARY TERMS

1. Sonnet
2. Elegy
3. Simile
4. Metaphor
5. Personification
6. Essay
7. Humour
8. Irony
9. Short Essay
10. Lyric
11. Onomatopoeia
12. Alliteration
13. Symbol
14. Imagery
15. Myth

#### UNIT - II : (FOR DETAILED STUDY)

1. Francis Bacon : of Youth and Age
2. Steele : The Spectator Club
3. Addison : Meditations in Westminster Abbey

#### UNIT - III : (FOR DETAILED STUDY)

1. Lamb : Mackeray End in Hereford Shire
2. G.K.Chesterton : On the Pleasures of No Longer being Very Young
3. Lynd : The Student

#### UNIT - IV : (FOR NON-DETAILED STUDY)

1. R.N.Tagore : The Castaway
2. K.A.Abbas : Sparrows
3. Ernest Hemingway : Old Man at the Bridge

#### UNIT - V : (FOR NON-DETAILED STUDY)

1. Chinua Achebe : Marriage is a Private Affair
2. O. Henry : The Ransom of Red Chief
3. Maxim Gorky : The Mother of a Traitor

#### SUGGESTED READINGS

1. Sasi kumar and Paul : Spectrum : An Anthology of Short Stories Gunashekhar, Orient Longman
2. C.H.Lockitt, Longman : The Art of the Essayist
3. M.H.Abrams : The Glossary of Literary Terms
4. Coles : The Glossary of Literary Terms

## हिन्दी साहित्य - I

Course Code 5004-A2-I

आदिकालीन एवं भक्तिकालीन काव्य

### उद्देश्य :-

इस प्रश्न पत्र के अन्तर्गत विद्यार्थियों को आदिकालीन एवं भक्तिकालीन काव्य का अध्ययन कराया जाएगा, साथ ही छंद एवं अलंकारों का ज्ञान कराया जाएगा।

### पाठ्यक्रम :-

इस प्रश्न पत्र का पाठ्यक्रम पाँच इकाइयों में विभाजित किया गया है।

### यथा :-

### पाठ्य पुस्तकें :-

भक्ति काव्य सरिता : सं. डॉ. श्याम सुन्दर दीक्षित।

### इकाई प्रथम -

कबीर- पद संख्या 17 से 26 तक तथा 'मन कौ अंग'

जायसी - सिंहलद्वीप वर्णन खण्ड

### इकाई द्वितीय -

सूरदास- विनय पद वियोग ( आरंभिक 15 पद ) बाललीला

तुलसीदास- ( आरंभिक 5 पद ) अयोध्या काण्ड

### इकाई तृतीय -

रसखान - 20 छंद

मीरा- आरम्भिक 20 पद

### इकाई चतुर्थ -

सुन्दरदास- गुरु महिमा ( 1 - 14 तक )

ढोला-मारू रा दूहा - मारवणी संदेश ( 110 - 170 तक )

### इकाई पंचम -

आदिकाल एवं भक्तिकाल का प्रवृत्तिगत इतिहास।

### अलंकार -

अलंकार का अर्थ, काव्य में स्थान, प्रकार :- अनुप्रास, यमक, श्लेष, रूपक, व्यतिरेक, वक्रोक्ति, उपमा, दृष्टान्त, अर्थान्तरन्यास, संदेह, अतिशयोक्ति, विरोधाभास, असंगति, तद्गुण, उन्मीलित, यथासंख्य

### छंद -

परिभाषा, प्रकार, लक्षण एवं उदाहरण - चौपाई, गीतिका, उल्लाला, कुण्डलियां, मंदाक्रान्ता, शिखरिणी, बसंततिलका, इन्द्रवज्रा, सवैया ( मालती ) एवं धनाक्षरी

## हिन्दी साहित्य - II

Course Code 5004-A2-II

नाटक एवं रंगमंच

### उद्देश्य

इस प्रश्न पत्र के अन्तर्गत विद्यार्थियों को नाटक, एकांकी एवं रंगमंच की जानकारी दी जाएगी। इससे विद्यार्थी पाठ्य वस्तु के रूप में नाटक एवं एकांकी को समझ पाएँगे तथा रंगमंच के इतिहास की जानकारी ले पाएँगे।

### पाठ्यक्रम

इस पाठ्यक्रम को पाँच इकाइयों में विभाजित किया गया है-

### पाठ्य पुस्तकें

- अंधेर नगरी - भारतेन्दु हरिश्चन्द्र  
एकांकी सौरभ - सं. हमीदुल्ला

### इकाई प्रथम -

- अंधेर नगरी - भारतेन्दु हरिश्चन्द्र

### इकाई द्वितीय -

- दीपदान - रामकुमार वर्मा  
सच्चा धर्म - गोविन्द दास  
वापसी - विष्णु प्रभाकर  
रीढ़ की हड्डी - जगदीश चन्द्र माथुर

### इकाई तृतीय -

- सूखी डाली - उपेन्द्रनाथ अशक  
स्ट्राईक - भुवनेश्वर  
गिरती दीवारे - उद्यशंकर भट्ट  
हरितगंधा - हमीदुल्ला

### इकाई चतुर्थ -

- वसंत ऋतु का नाटक - लक्ष्मीनारायण लाल  
कपर्दु - मोहन राकेश  
आवाज़ का नीलाम - धर्मवीर भारती

### इकाई पंचम -

- हिन्दी नाटक का उद्भव एवं विकास  
हिन्दी रंगमंच का उद्भव एवं विकास

**संस्कृत - I**  
**Course Code 5004-A3-I**  
**काव्य एवं नाटक**

**उद्देश्य**

1. कालिदास प्रणीत कुमारसम्भवम्( पंचम सर्ग )की जानकारी प्रदान करना।
2. नीतिशतकम् की जानकारी प्रदान करना।

**पाठ्यक्रम**

1. कुमारसम्भवम्( पंचम सर्ग ) - महाकवि कालिदास प्रणीत
2. नीतिशतकम्( मूर्खपद्धति, विद्वतपद्धति व मानशौर्य पद्धति ) - भर्तृहरि प्रणीत
3. स्वप्नवासवदत्तम् - भास प्रणीत

**पाठ्यक्रम की इकाईयों**

**प्रथम इकाई -**

कुमारसम्भवम्( पंचम सर्ग ) श्लोक संख्या 1 से 43 पर्यन्त

**द्वितीय इकाई -**

कुमारसम्भवम्( पंचम सर्ग ) श्लोक संख्या 44 से 86 पर्यन्त

**तृतीय इकाई -**

नीतिशतकम्( मूर्खपद्धति, विद्वतपद्धति व मानशौर्य पद्धति )

**चतुर्थ इकाई -**

स्वप्नवासवदत्तम् अंक 1 से 3 तक

**पंचम इकाई -**

स्वप्नवासवदत्तम् अंक 4 से 6 तक

**सहायक पुस्तकें -**

1. कुमारसम्भवम्( पंचम सर्ग ) - महाकवि कालिदास - डॉ. बाबूलाल त्रिपाठी
2. नीतिशतकम्- भर्तृहरि - व्याख्याकार- डॉ. रूपनारायण त्रिपाठी

3. नीतिशतकम्- भर्तृहरि - व्याख्याकार- डॉ. राकेश शास्त्री
4. संस्कृत साहित्य की रूपरेखा - पाण्डेय एवं व्यास
5. संस्कृत साहित्य का इतिहास - प. बलदेव उपाध्याय
6. स्वप्नवासवदत्तम् - डॉ. राकेश शास्त्री
7. स्वप्नवासवदत्तम् - डॉ. यशवन्त जोशी

**संस्कृत - II**  
**Course Code 5004-A3-II**  
**गद्य व्याकरण एवं अनुवाद**

**उद्देश्य**

1. पंचतन्त्र से छात्रों का परिचित कराना।
2. छात्रों को लघु सिद्धान्त कौमुदी के संज्ञा एवं अच् सन्धि प्रकरण से अवगत कराना।
3. छात्रों का कारक प्रकरण समास, शब्द धातुरूप एवं अनुवाद की जानकारी देना।

**पाठ्यक्रम**

1. गद्य - पंचतन्त्र से अपरिक्षितकारकम्-पं. विष्णु शर्मा प्रणित
2. व्याकरण-
  1. लघुसिद्धान्त कौमुदी - संज्ञाप्रकरण
  2. लघुसिद्धान्त कौमुदी - अच् सन्धि प्रकरण
3. सिद्धान्त कौमुदी - कारक प्रकरण

( कर्तुरीप्सिततमं कर्म, अकथितं च, अधिशीङ्स्थासां कर्म, उपान्वध्याङ् वसः, कालाध्वनोरत्यन्तसंयोगे, साधकतमं करणम्, अपवर्गं तृतीया, सहयुक्तेऽप्रधाने, येनाङ्गविकारः, इत्थंभूतलक्षणे, कर्मणा यमभिप्रैति स सम्प्रदानम्, रूच्यर्थानां प्रीयमाणः, धारेरूत्तर्णः, क्रुधदुहेर्ष्या सूयार्थानां यं प्रति कोपः, तादर्थ्यं चतुर्थी वाच्या, नमः स्वस्ति स्वाहा स्वधाऽलं वषड्योगाच्च, ध्रुवमपायेऽ पादानम् भीत्रार्थानां भयहेतुः वारणार्था नामीप्सितः, आख्यातोपयोगे, जनिकर्तुः प्रकृतिः, भुवः प्रभवः, दूरान्तिकार्थेभ्यो द्वितीया च, पृथग्विनानाभिस्तृतीयाऽन्यतरस्याम्, षष्ठी शेषे, षष्ठी हेतु प्रयोगे, आधारोऽअधिकरणम्, सप्तम्यधिकरणे च षष्ठी चानादरे, यतश्च निर्धारणम् ) उक्त सूत्रों में से किसी एक सूत्र की सोदाहरण व्याख्या पूछी जायेगी।

## 4. समास

अव्ययीभाव, तत्पुरुष, कर्मधारय, द्विगु, बहुब्रीहि एवं द्वन्द्व समास का सामान्य परिचय। ( समस्त पद देकर उसका विग्रह तथा नाम निर्देश पूछा जाएगा। )

## 5. शब्द रूप

राम, हरि, गुरु, कर्तु, पितृ, गौ, भगवत, करिन्, आत्मन्, राजन्, विद्वस्, रमा, मति,

नदी, धेनु, वधु, भवत्, युष्मद्, किम्, यत्, तद्, आदि शब्द सभी विभक्तियों में।

## 6. धातु रूप

लभ्, पठ्, गम्, कृश, स्मृ, प्रा, सह, आस्, क्रीड्, नृत्, भ्रम्, ज्ञा, कथ्, ग्रह, भक्ष्, भुज्, चुर, नम् एवं चिन् धातु रूप लट्, लोट्, लङ्, लिङ्, लृट् लकारों में।

## 7. अनुवाद

हिन्दी से संस्कृत में तथा संस्कृत से हिन्दी में।

पाठ्यक्रम की इकाइयों-

**प्रथम इकाई :**

पंचतन्त्र से अपरिक्षितकारकम्- कथा सख्या 1 से 7 पर्यन्त

**द्वितीय इकाई :**

पंचतन्त्र से अपरिक्षितकारकम्- कथा सख्या 8 से 15 पर्यन्त

**तृतीय इकाई :**

संज्ञाप्रकरण एवं अच् सन्धि प्रकरण

**चतुर्थ इकाई :**

कारक प्रकरण एवं समास

**पंचम इकाई :**

शब्द रूप, धातु रूप एवं अनुवाद( हिन्दी से संस्कृत में तथा संस्कृत से हिन्दी में )

**सहायक पुस्तकें -**

1. कारक प्रबोध - प्रो. हेमलता बोलिया एवं डॉ. शक्तिकुमार शर्मा
2. प्रोढ रचनानुवाद कौमुदी - डॉ. कपिल देव द्विवेदी
3. संस्कृत व्याकरण प्रवेशिका - डॉ. बाबूराम सक्सेना
4. अपरिक्षितकारकम् - पं. विष्णु शर्मा
5. संस्कृत व्याकरण - डॉ. प्रीतिप्रभा गायल
6. बृहद् संस्कृत निबन्ध - पं. शिवप्रसाद द्विवेदी
7. लघु सिद्धान्त कौमुदी - महेश सिंह कुशवाहा

## इतिहास - I

Course Code 5004-A4-I  
प्राचीन भारत का इतिहास एवं संस्कृति

### उद्देश्य

1. विद्यार्थियों को प्राचीन भारतीय संस्कृति एवं इतिहास के स्रोतों की जानकारी।
2. विभिन्न कालों में भारत में विभिन्न धर्मों एवं जातियों की जानकारी।
3. प्राचीन भारतीय प्रशासनिक, सैनिक, राजनैतिक एवं सामाजिक उपलब्धियों का बोध कराना।

### प्रथम इकाई -

1. प्राचीन भारत के इतिहास जानने के स्रोत
2. सिन्धु घाटी सभ्यता ( हडप्पा संस्कृति )
3. ऋग्वैदिक सभ्यता एवं संस्कृति
4. उत्तर वैदिक कालीन सभ्यता एवं संस्कृति

### द्वितीय इकाई -

1. जैन धर्म
2. बौद्ध धर्म
3. भारतीय इतिहास एवं संस्कृति को जैन धर्म एवं बौद्ध धर्म का योगदान।
4. यूनानी आक्रमण : सिकन्दर का भारत पर आक्रमण एवं आलोचनात्मक विवरण

### तृतीय इकाई -

1. मौर्यकालीन इतिहास के स्रोत : कोटिल्य और मैगस्थनीज
2. चन्द्रगुप्त एवं मौर्य प्रशासन।
3. अशोक महान एवं अशोक का धम्म।

4. मौर्य साम्राज्य के पतन के कारण।
5. शुंग एवं सातवाहन वंश : सामाजिक एवं सांस्कृतिक स्थिति।

### चतुर्थ इकाई -

1. कनिष्क और भारतीय संस्कृति को योगदान
2. समुद्रगुप्त की सैनिक उपलब्धियाँ
3. चन्द्र गुप्त-द्वितीय की उपलब्धियाँ
4. भारतीय संस्कृति को गुप्त काल का योगदान
5. गुप्तयुग के पतन के कारण

### पंचम इकाई -

1. हर्षवर्धन की उपलब्धियाँ
2. हर्ष का प्रशासन एवं धर्म
3. पड़ोसी देशों में भारतीय संस्कृति व विस्तार
4. राजपूतकालीन सभ्यता एवं संस्कृति
5. दक्षिणी भारत : चोल और चालुक्य वंश

### संदर्भग्रन्थ -

1. दत्ता और चौधरी : प्राचीन भारत
2. रमाशंकर त्रिपाठी : प्राचीन भारत
3. बी.एन. लुनिया : प्राचीन भारत का राजनीतिक एवं सांस्कृतिक इतिहास
4. डी.डी. कोशाम्बी : भारतीय इतिहास एवं संस्कृति
5. बी.एल. झा : प्राचीन भारत की रूपरेखा
6. एल.पी. शर्मा : प्राचीन भारत

## इतिहास - II

Course Code 5004-A4-II

राजस्थान का इतिहास एवं संस्कृति ( 1000- 1717 ई. )

### उद्देश्य

1. विद्यार्थियों को राजस्थान के इतिहास एवं संस्कृति से अवगत कराना।
2. विदेशी आक्रमणकारी के साथ संघर्षों व उपलब्धियों की जानकारी देना।
3. प्राचीनकाल से लेकर आधुनिक काल तक हुए संघर्षों में आमजन की भागीदारी को बताना।

### प्रथम इकाई -

1. राजस्थान के इतिहास जानने के मुख्य स्रोत
2. पृथ्वीराज चौहान : व्यक्तित्व एवं उपलब्धियां
3. जालोर, रणथम्भौर और चित्तौड़ के केन्द्रिय शक्तियों के साथ संबंध : अल्लाउद्दीन खिलजी के संदर्भ में।

### द्वितीय इकाई -

1. महाराणा कुम्भा : राजनीतिक एवं सांस्कृतिक उपलब्धियां
2. महाराणा सांगा : बाबर के साथ संबंध
3. मालदेव : केन्द्रीय शक्तियों के साथ संबंध

### तृतीय इकाई -

1. महाराणा उदयसिंह : अकबर के साथ संबंध
2. महाराणा प्रताप : अकबर के साथ संबंध
3. प्रताप की उपलब्धियां
4. महाराणा अमरसिंह और 1615 की मुगल संधि
5. महाराणा जसवन्त सिंह : मुगल उत्तराधिकार संघर्ष में भूमिका

6. महाराजा अजितसिंह : मारवाड का तीस वर्षीय स्वतन्त्रता संग्राम
7. महाराजा सवाई जयसिंह : राजस्थान की राजनीति के संदर्भ में।

### चतुर्थ इकाई -

1. मराठों का राजस्थान की राजनीति में हस्तक्षेप और इसके प्रभाव
2. राजस्थान के शासकों और ईस्ट इण्डिया कम्पनी के मध्य संधियाँ
3. 1857 का प्रथम स्वतन्त्रता संग्राम और राजस्थान के शासकों का दृष्टिकोण।

### पंचम इकाई -

1. आधुनिक राजस्थान के निर्माण की प्रक्रिया :
2. किसान आन्दोलन
3. प्रजामण्डल आन्दोलन
4. राजस्थान का एकीकरण

### संदर्भ ग्रन्थ -

1. दशरथ शर्मा : पृथ्वीराज चौहान और उसका काल
2. जी.एन. शर्मा : राजस्थान का इतिहास
3. आर.पी. शर्मा : वृहत राजस्थान का इतिहास ( प्रथम व द्वितीय भाग )
4. एम.एस. जैन : आधुनिक राजस्थान का इतिहास
5. गुप्ता एवं व्यास : राजस्थान का इतिहास
6. पृथ्वीसिंह मेहता : हमारा राजस्थान
7. व्यास : राजस्थान का इतिहास
8. गुप्ता एवं ओझा : आधुनिक राजस्थान का इतिहास

## POLITICAL SCIENCE - I

Course Code 5004-A5-I

### FOUNDATION OF POLITICAL SCIENCE

#### OBJECTIVES

1. To Understand meaning, scope and nature of Political Science.
2. To Understand the Concept of liberty, Equality, Power , Authority.
3. To know the difference between Democracy and Dictatorship, parliamentary and presidential system.
4. To Understand Human rights and functions of Government

#### UNIT - I

Meaning, Scope and Nature of Political Science, Traditional and Contemporary perspectives. Behaviouralism and post Behaviouralism, Inter disciplinary approach, Relations of Political Science with other Social Sciences.

#### UNIT - II

Concepts - Liberty, Equality, Power, Authority and Legitimacy. Political system Sovereignty and Pluralism.

#### UNIT - III

Democracy and Dictatorship, Parliamentary and Presidential system, Federalism, Political Parties and Pressure Groups.

#### UNIT - IV

Human rights (Liberal and Marxist perspectives) Organs of Government and their functions. Theory of Separation of powers, check and balance theory.

#### UNIT - V

Contemporary Concepts - Political Development, Political modernization, Political Culture, Political Socialization.

#### SUGGESTED READINGS

1. A. Appadorai : jktuhfr foKku ds ewy vk/kkj
2. B.L. Fadia : jktuhfr foKku ds ewy fl)kUr
3. J.C. Johri : Principles of Political Science
4. A. Ashiravadam : Principles of Political Science
5. Dr. B.R. Purohit : Rajniti Shastra ke Siddhant

## POLITICAL SCIENCE - II

### Course Code 5004-A5-II

## INDIAN POLITICAL THINKERS

### OBJECTIVES

1. To Know about Indian Political Thinkers.
2. To Understand Indian Political Thinkers Philosophy.
3. To know Social, Political and Economic ideas of Raja Ram Mohan Ray.
4. To Understand Gandhis Philosophy.

### UNIT-I : MANU AND KAUTILYA

**Manu** : Subject matter of Manusmriti, Political Philosophy, State, King, Government. Law Judicial system. Treasury, Financial system and foreign-relations.

**Kautilya** : Subject matter of Kautilya's Arthshastra, Saptang theory, kingship, Ministerial council, Administrative system, Punishment, Mandal doctrine and shadgun ( six fold) policy.

### UNIT-II: RAJA RAM MOHAN ROY AND SWAMI VIVEKANAND

Social, Political and Economic ideas of Raja Ram Mohan Roy. Philosophical, Religious, Social and Political ideas of Swami Vivekanand.

### UNIT-III : GOPAL KRISHAN GOKHLE, BAL GANGADHAR TILAK AND GANDHI :

Political, Social, Education and Economic ideas of Gopal Krishna Gokhle. Political, Economic, Social and Religious ideas of Bal Ganga Dhar Tilak, Nationalism and Swaraj Movement of Tilak. M.K. Gandhi: Basis of Gandhian Philosophy, Truth, religion, Spiritualization in politics, Ahimsa, Satyagrah, Swarajya, Economic and social ideas. Concept of Ram Rajya and Vasudhev Kutumbkamb.

### UNIT-IV : PANDIT NEHRU AND M.N. ROY

Jawahar Lal Nehru : Political, economic and social ideas of Pt. Nehru, Humanism, Non-Alignment, socialism and secularism.

M.N. Roy : Basic Philosophy, Scientific, Political and Economic ideas. Neo- Humanism and Neo Democracy.

### UNIT-V : B.R. AMBEDKAR, JAI PRAKASH NARAIN AND VINOBA BHAVE

B.R. Ambedkar : Political, Social, and Economic ideas, Social Reforms, upliftment of Dalits and Welfare of poor and new Buddhism.

Jai Prakash Narain : Ideas on Socialism, Nationalism, Democracy, Sarvodaya, Lok Shakti, and Total Revolution (Sampoorna Kranti).

Vinoba Bhave : Socialism, Nationalism, Democracy and Sarvodaya.

### SUGGESTED READINGS

1. B.A Saletoro : Ancient Indian Political thought & Institutions
2. K.P. Jaiswal : Hindu Rajtantra
3. AS. Altekar : Pracheen Bharat Main Rajya Aur Shashan
4. J.P. Sood : Main currents of Indian Political Thought
5. V.P. Verma : आधुनिक भारतीय राजनीतिक एवं सामाजिक चिन्तन
6. विष्णु भगवान : भारतीय राजनीतिक विचारक
7. एस.एल. पाण्डे : भारतीय राजशास्त्र के प्रणेता
8. अवस्थी एवं अवस्थी : प्रतिनिधि भारतीय राजनीतिक चिन्तन

## **GEOGRAPHY - I**

### **Course Code 5006-A6-I**

## **PHYSICAL GEOGRAPHY**

### **UNIT - I**

1. Definition and Scope of Physical Geography
2. Origin of the Earth: Tidal Hypothesis of James, Jeans and Big bang theory of
3. Components of Solar System.
4. Earth's Interior: Seismological evidences of the structure and Zoning of the earth's interior.

### **UNIT - II : LITHOSPHERE**

- a. Continental Drift theory - Wegner's theory.
- b. Plate tectonic theory: Division of the crust in plates' boundaries and plate margins, mechanism of plate movements.
- c. Plate tectonics and associated feature.
- d. Theories of mountain building - geosynclines organ theory of Kober.

### **UNIT - III: ATMOSPHERE**

- a. Composition and Structure of the atmosphere.
- b. Global circulation pattern monsoon.
- c. Tropical cyclone.
- d. Climatic classification by koeppen.

### **UNIT - IV: CYCLE OF EROSION & LAND FORMS.**

- a. Cycle of erosion: views of W.M. Davis.
- b. Cycle of erosion: views of W. Penck.
- c. Fluvial Cycle of erosion and interruptions in it.
- d. Fluvial Land forms.

### **UNIT - V: HYDROSPHERE**

- a. Hydrological Cycle: Definition and Process.

- b. Ocean Bottom Relief: Futures, Atlantic, Pacific & Indian Oceans.
- c. Tides: Types and theories.
- d. Ocean current: Atlantic, Indian, Pacific.

### **SUGGESTED READINGS**

1. Conserva H. T., 2004: Illustrated Dictionary of Physical Geography, Author House, USA.
2. Gabler R. E., Petersen J. F. and Trapasso, L. M., 2007: Essentials of Physical Geography (8th Edition), Thompson, Brooks/Cole, USA.
3. Garrett N., 2000: Advanced Geography, Oxford University Press.
4. Goudie, A., 1984: The Nature of the Environment: An Advanced Physical Geography, Basil Blackwell Publishers, Oxford.
5. Hamblin, W. K., 1995: Earth's Dynamic System, Prentice Hall, N.J.
6. Husain M., 2002: Fundamentals of Physical Geography, Rawat Publications, Jaipur.
7. Monkhouse, F. J. 2009: Principles of Physical Geography, Platinum Publishers, Kolkata.
8. Strahler A. N. and Strahler A. H., 2008: Modern Physical Geography, John Wiley & Sons, New York.

## GEOGRAPHY - II

### Course Code 5006-A6-II

## HUMAN GEOGRAPHY

### UNIT - I

1. Definition and Scope of Human Geography
2. Its relation with other social Sciences.
3. Schools of Human Geography - Determinism, Possibilism and Neo-determinism
4. Concept of Man & Environment Relationship.

### UNIT - II

1. Cultural Regions : Nature and Bases.
2. Races of mankind origin, Physical Traits.
3. Religion-classification and distribution with special reference of india.
4. Language - Classification and distribution with special Reference of India

### UNIT - III

1. Distribution of Tribes in the world.
2. Habitat, Occupation & Social organization : Pigmies Eskimos and Khirgiz.
3. Distribution of Tribes in India.
4. Habitat, Economic Activities and Social organization of Bhil, Naga and Santhal.

### UNIT - IV

1. Rural Settlement - Types & pattern of rural settlements.
2. Rural Settlement in India - Types & Pattern.
3. Urban Settlement - Origin and classification in Patterns.
4. Classification & Urbanization and their problems slums.

### SUGGESTED READINGS

1. Chandna, R.C. (2010) Population Geography, Kalyani Publisher.

2. Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver.
3. Parpillo, Human Geography, Longmen Publ., London.
4. Bergwah. Edward, Human Geography, Culture Connections E. and Landscape, Prentice Hall New Jersey.
5. De Blij H.J, Human Geography, John Willey, New York.
6. प्रो. कौशिक, एस.डी., मानव भूगोल, रस्तोगी पब्लिकेशन, मेरठ।
7. मामोरिया, चतुर्भुज, मानव भूगोल साहित्य भवन, आगरा।
8. कौशिक, एस.डी., मानव भूगोल के सारल सिद्धान्त।

## GEOGRAPHY - II

### Course Code 5006-A6

## PRACTICALS

- A. Scales - Plain, Comparative, Diagonal, Time. **(4 Exercises)**
- B. Enlargement, Reduction and Combination of Maps. **( 2 Exercises)**
- C. Graphs - Polyline, Band **( 2 Exercises)**
- D. Topographical Sheet : Conventional Signs and Scheme of Indian topo sheets.

### SUGGESTED READINGS

1. Dent B. D., 1999: Cartography: Thematic Map Design, (Vol. 1), McGraw Hill.
2. Gupta K. K and Tyagi V. C., 1992: Working with Maps, Survey of India, DST, New Delhi.
3. Mishra R. P. and Ramesh A., 1989: Fundamentals of Cartography, Concept Publishing.
4. Robinson A., 1953: Elements of Cartography, John Wiley.
5. Sharma J. P., 2010: Prayogic Bhugol, Rastogi Publishers.
6. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers
7. Singh R. L., 1998: Prayogic Bhoogol Rooprekha, Kalyani Publications.
8. Steers J. A., 1965: An Introduction to the Study of Map Projections, University of London.

## ECONOMICS - I

### Course Code 5004-A7- I

## MICRO ECONOMICS

### OBJECTIVE

The main objective of this paper is to analyze the economic behavior of individuals, firm and markets. It is mainly concerned with the learning the students in very analytical and comprehensive manner with the various aspects of consumer behavior trends of costs, and the traditional and Modern theory of markets and equilibrium of firm.

### UNIT-I : INTRODUCTION

Definition of Economics and controversy involved there in. Nature of economic laws. Methods of study of economics inductive and Deductive, Micro & Macro, Static & Dynamic, Positive & Normative.

### UNIT-II : CONSUMER BEHAVIOUR

Meaning of Utility, types of utility (AU, MU, TU, point of satiety) law of diminishing Marginal Utility, Law of Equi-marginal Utility, Indifference curves meaning and properties of indifference curves, marginal rate of substitution, Budget line, Consumer's equilibrium with the help of Indifference curves and the factors affecting it. Price Income and substitution effect (Hicks), derivation of Demand curve with the help of I.C. Consumer's Surplus (Marshall and Hicks). Demand meaning types of demand. Elasticity meaning and importance, types of price elasticity, methods of measuring price elasticity of demand, concept of cross elasticity and income elasticity.

### UNIT-III : THEORY OF PRODUCTION

Production - meaning and its importance, Production functions- assumptions and types of production function (Introductory only).

Law of variable proportions, Isoquants-meaning, Properties, Diminishing Marginal rate of substitution (DMRTS) Optimum factor combination, Returns to scale. Different concepts of cost, Revenue and their inter-relation (TR, AR, MR, TC, AC, MC, FC, SC, AVC, ATC, AFC, -).

#### UNIT-IV : MARKET

Different forms of Market -their meaning and properties. Determination of price & output under different market situations in short run and long run. TR. & TC approach and Marginal Analysis Approach. Equilibrium of Firm and industry in Perfect Competition, Monopoly, Discriminating Monopoly and Monopolistic Competition.

#### UNIT-V : DISTRIBUTION

Marginal productivity theory of distribution, concept of Rent, Wages, Interest and Profit.

**Rent** : Ricardian theory of Rent, Modern theory of rent. Quasi rent

**Wages** : Money wages and real wages, Theories of wages, Subsistence wages theory of Marginal productivity theory, backward bending curve.

**Interest** : Classical and Liquidity Preference theory.

**Profit** : Innovation theory, Uncertainty theory, Risk bearing theory.

**Note** : In this paper practical problems will be set from unit II, III and IV.

#### SUGGESTED READINGS

- 1 Koutosoyiannis A: Modern Micro-economics. Macmill 1990
2. Samuelson P.A. and W.D. Nordhans : Economics 1998 (Tata McGraw Hill)
3. Stonier A.W. and D.C. Hague : A test book of Economics Theory IBS & Landon Group, 1972.

4. एम.पी. सिंह : माइक्रोअर्थशास्त्र-एस. चॉद एण्ड कम्पनी लि., नई दिल्ली
5. एम.एल. सेठ : माइक्रोअर्थशास्त्र-लक्ष्मीनारायण अग्रवाल, आगरा
6. एम.एल. सेठ : अर्थशास्त्र के सिद्धान्त, लक्ष्मीनारायण अग्रवाल, आगरा
6. लक्ष्मीनारायण नाथूरामका : व्यक्तिअर्थशास्त्र : सी.बी.एच. जयपुर
7. S.K. Singh : Micro Economics-SahityaBhawan, Agra
8. B.L. Ojha : व्यक्तिअर्थशास्त्र आदर्शप्रकाशन, जयपुर

## ECONOMICS - II

### Course Code 5004-A7- II

## INDIAN ECONOMICS

### OBJECTIVES

1. To enable the students to understand various dimensions of Indian Economy.
2. To enable them to analyze the policy issues and requirements.

### UNIT-I

Main features of the Indian Economy, characteristics of Developing Economy, the concept of Economic growth and Economic development, factors of economic development Growth of population, main feature of population, Labour force and occupational distribution of population, Population problem and current population policy.

### UNIT-II : AGRICULTURE & INDUSTRY

**Agriculture** : characteristics and importance of agriculture in India, Land reforms, problems of sub- division and fragmentation. Rural Indebtedness and agriculture credit with special reference to institutional credit. Current Agriculture Policy.

**Industry** : Role and problems of cottage and small scale industry in the developing economy, Industrial Policy, Industrial finance

### UNIT-III : FOREIGN TRADE & AID

Recent trends in India's foreign trade, Direction and composition of foreign trade, current foreign trade policy, export promotion, measures, Foreign Aid: size and utilization of foreign aid. Balance of payment crisis and the new economic reforms.

MNC' s and their impact on Indian Economics

### UNIT - IV : PLANNING

Broad objectives and strategies of five year plans, Current five year plan - its strategy, objectives and achievements. Review of

Economics progress under planning in India.

Unemployment problem & poverty alleviation programmes in India, New Economic Reforms, liberalisation, privatisation & Globalization.

### UNIT - V : ECONOMY OF RAJASTHAN

The position of Rajasthan in Indian Economy. Overall evaluation of planning in Rajasthan , Critical study of current Five year plan, Specific problems of economy of Rajasthan – Famines & Drought.; Environmental Pollution, Tourism Development in Rajasthan. Constraints in Economic Development of Rajasthan

### SUGGESTED READINGS

1. Mishra S.K & Puri V.K. : Indian Economy - its Development Experiment, Himalaya Publication.
2. Ruddra Dutt & Sundaram : Indian Economy, S.Chand & Company, New Delhi
3. A.N. Agrawal : Indian Economy (Company, Witley Eastern Ud) New Delhi, Latest Ec.
4. Dhingra, I.C. : The Indian Economy - Environment & Policy - S.Chand & Co, Delhi.
5. बी. एल. ओझा : भारतीय अर्थ व्यवस्था, आदर्श प्रकाशन, जयपुर, नवीनतम संस्करण
6. लक्ष्मीनारायण नाथूरामका : भारतीय अर्थ व्यवस्था, कॉलेज बुक हाउस, जयपुर, नवीनतम संस्करण
7. मामोरिया एण्ड जैन : भारतीय अर्थ व्यवस्था, साहित्य भवन, नवीनतम संस्करण

**SOCIOLOGY - I**  
**Course Code 5004-A8-II**  
**ELEMENTARY SOCIOLOGY**

**UNIT –I : SOCIOLOGY & SOCIOLOGICAL PERSPECTIVE**

- a) Definition and Subject Matter.
- b) Sociology Perspective : (i) Scientific (ii) Humanistic
- c) Relationship with other Social Sciences-Social Anthropology, Economics, History and Political Science.
- d) Development of Sociology in India.

**UNIT –II : BASIC CONCEPTS**

- a) Society and Community.
- b) Association and Institution.
- c) Norms and Values.
- d) Status and Role.

**UNIT –III**

**1. Socialization :**

- a) Meaning and Definition.
- b) Agencies and Stages
- c) Theories of Socialization (Sigmund Freud, G.H. Mead and C.H. Cooley)

**2. Social Processes :**

- a) Cooperation.
- b) Competition.
- c) Conflict.

**UNIT –IV**

**1. Social Groups :**

- a) Primary Groups : Meaning and Characteristics.
- b) Secondary Groups : Meaning and Characteristics.

**2. Social Stratification :**

- a) Concept and Bases.
- b) Theories : Functional (Kingsley Davis & Moore) and Marxian (Karl Marx).

**UNIT –V : USE OF SOCIOLOGY**

Introduction to Applied Sociology ; Sociology and Social Problems ; Sociology and Social Policy, Action Sociology and Development – Sociology and Profession.

**SUGGESTED READINGS**

1. Bottomore, T.B. : Sociology : A Guide to Problems and Literature Bombay George Allen and Unwin (India), 1972.
2. Haralambos, M. : Sociology : Themes and Perspective. New Delhi : Oxford University Press, 1988.
3. Jayaram, N. : Introductory Sociology : Madras, Macmillan India, 1988.
4. Singh J. P. : Samaj Shastra : Awdharana Avam Sidhant, Perntice Hall, New Delhi, 2001.
5. दोषी, एस.एल. एवं जैन: समाजशास्त्र : नई दिशाएँ, नेशनल पब्लिशिंग हाउस, जयपुर, 2004.

## SOCIOLOGY - I

Course Code 5004-A8-II

### SOCIETY OF INDIA

#### UNIT - I : HISTORICAL MOORINGS OF THE INDIAN SOCIETY

- a) Approaches to the study of Indian Society.
- b) Indian Society and its Traditional Social Structures
- c) Socio-Cultural Dynamics during different periods of History

#### UNIT - II : DIVERSITY AND UNITY IN INDIAN SOCIETY

- a) Diversity in Indian Society
- b) Unity in Indian Society
- c) Towards National Society

#### UNIT - III : CASTE SYSTEM, STRUCTURE AND CHANGE

- a) Different perspectives in the analysis of caste
- b) Characteristics of caste
- c) Caste and Varna, Caste and Tribe, Caste and Race, caste and politics.

#### UNIT - IV : WEAKER SECTIONS OF INDIAN SOCIETY

- a) Scheduled caste and their problems
- b) Other backwards classes and their problems.

#### UNIT - V : FAMILY, MARRIAGE AND KINSHIP

- a) Definition and Characteristics
- b) Types
- c) Changing Pattern

#### SUGGESTED READINGS

1. Doshi, S.L. and Jain, P.C. : Indian Society : Continuity and Change (In Hindi) National Publishing House, Jaipur, 2004.

2. प्रो. गुप्ता, एम.एल. एण्ड : भारतीय सामाजिक संस्थाएँ ( हिन्दी ) डॉ. शर्मा, डी. डी. : राजस्थान हिन्दी ग्रन्थ अकादमी, जयपुर
3. श्रीनिवास, एम.एन. : आधुनिक भारत में सामाजिक परिवर्तन वाकले युनिवर्सिटी ऑफ केलीफोर्निया, 1996
4. शर्मा, के. एल. : भारतीय सामाजिक संरचना एवं परिवर्तन, रावत पब्लिकेशन जयपुर, 2007
5. आहूजा, राम : भारतीय सामाजिक व्यवस्था, रावत पब्लिकेशन, जयपुर, 2005

# SCIENCE

## PHYSICS - I

Course Code 5004-A9-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 Foucault 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, Poiseuille's law, Reynold's number, Stoke's law, theory of rotation viscometer, effect of temperature and pressure on the viscosity of liquids.

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

**TEXT BOOKS**

1. Mechanics- J.C.Upadhyaya, Ram Prasad & Sons
2. Mechanics- D.C.Mathur S.Chand & Co.
3. Mechanics of Particles, Rigid Bodies and Continuous Media (In Hindi) by Kalra, Bhandari and Kakani

**SUGGESTED READINGS**

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. 1. B.I. publications, Bombay, Delhi, Calcutta, Madras.
3. Mechanics of particles, Rigid Bodies and Continuous Media (In Hindi) by Kalra, Bhandari and Kakani

**PHYSICS - II**

Course Code 5004-A9-II

**OSCILLATIONS, WAVES AND ACOUSTICS****UNIT - I**

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

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

**UNIT - II**

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

**Fourier analysis** : Fourier series and Fourier coefficients; simple examples (square wave, saw-tooth wave, half and full wave rectifier), use of exponential representation for harmonic oscillations, expression for Fourier coefficients

**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.

**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, dispersion in waves, group velocity and phase velocity

**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.

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

#### TEXT BOOKS

1. Waves & Oscillations, Satya Prakash, Pragati Prakashan
2. Oscillations, Waves and Acoustics (In Hindi) by Kakani, Bhandari & Kalra

#### SUGGESTED READINGS

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

## PHYSICS - III

Course Code 5004-A9-III

### ELECTRICITY AND MAGNETISM

#### UNIT - I

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

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

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

#### UNIT - II

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

**Magnetic field** : Magnetic field  $\mathbf{B}$  seen through Lorentz force on a moving charge, unit for  $\mathbf{B}$  field, magnetic dipoles in atoms and molecules, gyromagnetic ratio. Magnetic field due to currents: Biot

and Savart's law. Field equations in magnetostatics, Ampere's law. Fields due to a straight wire, magnetic dipole, circular current and solenoid. Magnetic fields in matter. Magnetizing current, magnetization vector,  $\mathbf{H}$  and  $\mathbf{B}$  fields, magnetic permeability, susceptibility. Comparison of magnetostatics and electrostatics.

### UNIT - III

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

### UNIT - IV

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

### UNIT - V

Ballistic Galvanometer (moving coil type), its distinction from beat type. B.G. differential equation and its solution under different conditions of damping. Critical damping, over damping. Logarithmic decrements, charge sensitivity, current sensitivity, determination of  $B$  using search coil and B.G. Determination of high resistance using B.G. Factors for sensitivity. B.G. constant. Measurement of mutual inductance by Carey Foster's bridge by B.G. Measurement of small resistance by Kelvin's double bridge. Recent developments in Physics including discussion of Nobel prizes in Physics (no questions to be set in the theory examination).

### TEXT BOOKS

1. A.S. Mahajan and A.A. Rangawala, Electricity and Magnetism, Tata McGraw Hill.
2. Electricity and Magnetism, P. Chakrabarty and K.C. Gupta, New Age International.
3. Electricity and Magnetism (In Hindi) by Bhandari, Kalra and Kakani

### SUGGESTED READINGS

1. E.M. Purcell, Ed. Berkely Physics Course, Vol. 1, Electricity and Magnetism McGraw Hill.
2. D. Halliday and R. Resnick, Physics, vol. 2, Wiley Eastern, New Delhi.

## PHYSICS

### Course Code 5004-A9

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

Figure : 3

Formula/Theory : 3

Observation : 10

Calculation (including error) and Result : 6

Precautions : 2

(ii) Viva voce 12

(iii) Records 15

### LIST OF EXPERIMENTS

#### Important Note:

(i) Before starting experiments, students should be taught errors in measurement, propagation of errors, importance of significant figures, identifying variables in experiment, importance of graphical presentation of data. Results without quoting errors should not be approved.

#### Section-A

1. Determination of elastic constants  $Y$ ,  $f\theta$ ,  $\epsilon m$  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 pendulum , 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 statisticalmethod 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 Poiseville's method.
  22. Studying the fall of solids through a liquid.
  - 23 To determine the coefficient of viscosity of a liquid (glycerin or castor oil) by Stoke's method
  23. Study of air flow through a capillary: U- tube with a long capillary fitted on one arm, mercury level difference pushing air.
  24. To determine Poisson's ratio of rubber
  25. Measurements of length (or diameter) using vernier caliper, screw gauge and traveling microscope.
  26. To determine the Height of a Building using a Sextant.
  27. To determine the Moment of Inertia of a Flywheel.
  28. To determine the Young's Modulus of a Wire by Optical Lever Method.
  29. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
  30. To determine the Elastic Constants of a Wire by Searle's method.
  31. To determine  $g$  by Bar Pendulum.
  32. To determine  $g$  by Kater's Pendulum.
  34. To determine  $g$  and velocity for a freely falling body using digital timing technique
  35. To study the Motion of a Spring and calculate (a) Spring Constant (b) Value of  $g$

### 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 relationship 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. To verify the Superposition, and Maximum Power Transfer Theorem
- 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  $L$
24. To use a Multimeter for measuring

- Resistances,
  - AC and DC Voltages,
  - DC Current
  - checking electrical fuses.
24. Ballistic Galvanometer:
- Measurement of charge and current sensitivity
  - Measurement of CDR
  - Determine a high resistance by Leakage Method
  - To determine Self Inductance of a Coil by Rayleigh's Method.
25. Measurement of field strength B and its variation in a Solenoid (Determine  $dB/dx$ ).
26. To verify the Thevenin and Norton theorem

## CHEMISTRY - I

### Course Code 5004-A10-I

## INORGANIC CHEMISTRY

### 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, multicenter bonding in electron deficient molecules, bond strength and bond energy, percentage ionic character from dipole moment and electro-negativity difference.

**Ionic Solids** : Ionic structures, radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, semi-conductors, lattice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule. Metallic bond - free electron, valence bond and band theories.

**Weak Interactions** - Hydrogen bonding, van der waals forces.

### UNIT-II

**s-Block Elements** : Comparative study, diagonal relationships, salient features of hydrides, 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, polymorphism, hydrides, halides, 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<sub>3</sub> and liquid SO<sub>2</sub>

**Acids and Bases** - Arrhenius, Bronsted - Lowry, Lux-Flood, Solvent system and lewis concepts of acid and bases, Usanovitch definition.

#### SUGGESTED READINGS

1. Concise Inorganic Chemistry : J.D. Lee
2. General Inorganic Chemistry : J.A. Duffy, Longman (2nd.)
3. Principles of inorganic Chemistry : B.R. Puri and L.R. Sharma
4. अकार्बनिक रसायन - लवानिया, गुप्ता, ओझा एवं बंसल
5. अकार्बनिक रसायन - सुरेश आमेटा, पंकी बी. पंजाबी, भूपेन्द्र शर्मा, हिमांशु पब्लिकेशन्स, उदयपुर

## CHEMISTRY - II

Course Code 5004-A10-II

### ORGANIC CHEMISTRY

#### UNIT-I

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

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

**Reactive intermediates** : Carbocations, carbanions, free radicals, carbenes, arynes and nitrenes, their formation and stabilities.

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

#### UNIT-II

**Stereochemistry of Organic Compounds** - Concept of isomerism, types of isomerism.

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

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

Geometric isomerism - determination of configuration of geometric isomers. E and Z systems 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  $\text{KMnO}_4$ , 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 allene and butadiene, methods of formation, polymerization chemical reactions - 1, 2 and 1, 4 - additions, Diels Alder reaction.

**Alkynes** : Acidity of alkynes, mechanism of electrophilic and nucleophilic addition, reaction 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, reaction of alkyl halides,  $\text{SN}_2$  and  $\text{SN}_1$  reactions with energy profile diagrams, factors affecting  $\text{SN}_2$  and  $\text{SN}_1$  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 reactivities of alkyl halides v/s allyl, vinyl and aryl halides, synthesis and uses of DDT and BHC.

### SUGGESTED READINGS

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. Agrawal.

4. A Text book of Organic Chemistry : B.S. Bahl and Arun Bahl.
5. Organic Chemistry (Hindi ed) : Suresh Ameta, A. Sharma and M. Mehta, Himanshu Pub., Udaipur
6. Organic Chemistry (Hindi & Eng. Ed) : Suresh Ameta, Pinki B. Punjabi, Bhupendra Sharma, Himanshu Pub., Udaipur
7. कार्बनिक रसायन : सुरेश आमेटा, पिंगी बी. पंजाबी, भूपेन्द्र शर्मा

## CHEMISTRY - III

### Course Code 5004-A10-III

## PHYSICAL CHEMISTRY

### UNIT-I

**Mathematical Concepts** : Logarithmic relations, curve sketching, linear graphs and calculation of slopes, differentiation of function like  $Kx$ ,  $ex$ ,  $xa$ ,  $\sin x$ ,  $\log x$ , 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 smectic, nematic and cholesteric phases,

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

### UNIT-III

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

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

**Colloidal State** : Definition of colloids, classification of colloids.

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

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

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

### UNIT-IV

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

### UNIT-V

**Atomic Structure** : Dual nature of electron, De Broglie equation, Davisson and Germer experiment, Heisenberg uncertainty

principle, Schrodinger wave equation, Significance of  $\psi$  and  $\psi^2$ , probability distribution curves, shapes of s, p and d - orbitals, Zeeman and Stark effects.

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

### SUGGESTED READINGS

1. Principle 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 (Hindi ed.) Suresh Ameta, R.C. Khandelwal, R. Ameta and J. Vardia, Himanshu Pub.
4. Physical Chemistry, Pt I & II : C.M. Gupta, J.K. Saxena and M.C. Purohit.

**CHEMISTRY**  
**Course Code 5004-A10**  
**PRACTICALS**

**EXERCISES**

- |  |    |
|--|----|
| 1. Semi-micro Analysis of Inorganic Mixture containing five radicals (excluding Na <sup>+</sup> and K <sup>+</sup> )     | 20 |
| 2. (i) Detection of extra elements (N, S and halogen) if any and functional groups in given simple organic compounds.    | 10 |
| (ii) Purification of the given organic compounds by crystallization (charcoal) sublimation and determination of its m.p. | 10 |

**OR**

Determination of mixed melting points using urea-cinnamic acid mixtures of given compositions.

- |                                      |           |
|--------------------------------------|-----------|
| 3. ONE Physical Chemistry Experiment | 15        |
| 4. Viva-Voce                         | 10        |
| 5. Records                           | 10        |
| <b>Total</b>                         | <b>75</b> |

**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 II-A & II-B may be given. Not more than one interfering radical may be given. Interfering radical may not be given with typical anion combinations.
2. (i) Detection of extra elements (N.S. and halogen) if any and functional group in given simple organic compounds (One organic compound from the following list be given for identification).

Carboxylic acids, Phenols, Alcohols, Carbohydrates, Aldehydes, Ketones, Nitro Compounds, Amino compounds, Antilides, Amides, Esters, Thioamide.

Hydrocarbons, Halogen containing compounds.

**(ii) Crystallization :**

Concept of induction of crystallization.

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

Acetanilide from boiling water.

Naphthalene from ethanol.

Benzoic acid from water.

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

**Simple sublimation** : Camphor, Naphthalene, Phthalic acid and Succinic acid.

**MIXED MELTING POINT DETERMINATION**

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

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

**Distribution Law**

- (i) To study the distribution of iodine between water and CCl<sub>4</sub>.
- (ii) To study the distribution of benzoic acid between benzene and water.
- (iii) To study the distribution of acetic acid between benzene and water.

**Colloids :**

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

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

- (ii) To determine the percentage composition of given binary mixture by surface tension method.
- (iii) To determine the parachor value of - CH<sub>2</sub> - group.
- (iv) To determine the rheochor value of - CH<sub>2</sub> - group.

#### TRANSITION TEMPERATURE

- (i) Determination of the transition temperature of the given substance by thermometric / dilatometric method (e.g.: MnCl<sub>2</sub>, 4H<sub>2</sub>O, BrBr<sub>2</sub>, 2H<sub>2</sub>O).

#### 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.

#### SUGGESTED READINGS

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

## MATHEMATICS - I

### Course Code 5004-A11- I

## ALGEBRA

#### 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.

**SUGGESTED READINGS**

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

## MATHEMATICS - II

### Course Code 5004-A11- II

## CALCULUS

**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.

**SUGGESTED READINGS**

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. Codington : An introduction to ordinary Differential Equations Prentice Hall of India, 1961.
  4. P.K. Jain and : An Introduction to Real Analysis, S. Chand & S. K. Kaushik Co., New Delhi-11, 2000.
  5. Bansal, Bhargava : Avakalan Ganita-II
  6. Bansal, Bhargava : Samakalan Ganita-II
  7. Gokhroo, Saini : Uchch Avakalan Ganita.
  8. Gokhroo, Saini : Uchch Samakalan Ganita.
  9. Bansal, Bhargava & : Avkal Samikaran I .Agrawal
  10. Gokhroo, Saini, Kumbhat : Avkal Samikaran.

## MATHEMATICS - III

### Course Code 5004-A11- III

## GEOMETRY

### 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.

**SUGGESTED READINGS**

1. Gorakh Prasad : A Text book of coordinate and H.C. Gupta Geometry (Pothishala)
2. S.L.Loney : The Elements of coordinate Geometry; Mack-Millan and Company, London.
3. R.J.T. Bell : Elementary Treatise on coordinate Geometry of 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 Dimensions. (Pothishala)
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.

**COMPUTER SCIENCE - I**

Course Code 5004-A12- I

**OPERATING SYSTEM AND FUNDAMENTALS OF C PROGRAMMING****UNIT-I**

**Familiarity with terms** : Application and System software, common system softwares: compiler, interpreter, assembler, operating system, loader, linker.

**Operating system** : Generation of operating systems, concepts - process, file, directory, shell, functions of operating system.

**Memory management** : Single contiguous allocation, partitioned allocation, relocatable partition, paged allocation, segmented allocation.

**UNIT-II**

**Computer Processing Techniques** : Batch processing, on-line processing, multiprogramming, time sharing, real time processing.

**Single user OS** : DOS - History, Booting process, types of commands - internal, external. Concept of files and directories. Batch file processing, editors in DOS, redirection of input and output.

**Multi-user OS** : UNIX-History, design principles, user programmer interface, file system, processor management, memory management, shell, kernel, UNIX commands, editors in UNIX.

**UNIT-III**

**Language C** : Introduction to C, basic structure of a C program, constants, variables, data types and their sizes.

**Operators and expressions** : Arithmetic, relational, logical, increment, decrement, conditional, bitwise, special operators.

**Arithmetic expressions** : Evaluation, precedence of operators, type conversions, simple programs based on these concepts.

**UNIT-IV**

**Language C** : Control of flow statements and blocks, ifelse, else-If, switch. Loops - while, for, do while, break, continue, GOTO, labels, programs using these statements.

**Arrays** : Introduction to one, two, multidimensional arrays.

**User defined functions** : Need of user defined functions, multifunction programs categories of function, arguments and their types, return values and their types, recursion, scope and lifetime of variables in function, programs based on above concepts.

**UNIT-V**

**Language C** : Structures : Defining and processing structured data types, structure initialization, array of structures, array with structures, array of structures, hierarchical structure, union, size of structure, operations on structure.

**Pointers** : Understanding pointers, accessing variables through pointers, declaring and initializing pointers, pointer expressions, pointers and arrays, pointers and character strings, pointers and functions, pointers and structures, pointers on pointers.

**File management in C** : Introduction, Simple processing of sequential and random access files, command line arguments, error handling during I/O Operations.

**SUGGESTED READINGS**

1. Donovan J.J, System Programming, McGraw-Hill, International series.
2. Damdhare D.M., Introduction to system software, Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Deitel H., Operating system, Second Edition, Addison Wesley Publishing Company(International Edition).
4. Rajaraman V., Computer programming in C, Prentice Hall of India Private Limited, New Delhi.
5. Gottfreid, Programming with C, Schaum's Outline Series, 1991 Tata McGraw-Hill Publishing Company Limited, New Delhi.

6. Balguruswamy E., Programming in ANSI C, Second Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.
7. Donovan J., System Programming, Tata McGraw Hill Publishing Company Limited, New Delhi.

## COMPUTER SCIENCE - II

Course Code 5004-A12- II

### DATABASE MANAGEMENT SYSTEM

#### UNIT-I

Database concepts - Database design, design philosophies, conceptual, logical and physical models.

Database management system : Goals and objectives, classical data models : Relational, Network and Hierarchical models.

#### UNIT-II

Schema and sub-schema, Data definition and data manipulation languages : introduction, brief idea of CODASYL DDL. Study of relational model : E-R model, reducing of E.R diagram to tables and design of Relational database based on E-R model.

#### UNIT-III

File Organization : Logical and physical file organization, sequential, random, hierarchical, inverted, multilinked. Indexing and hashing files.

#### UNIT-IV

RDBMS Concepts: Relationals, domains, attributes, scheme, keys, relational algebra, Simple relational and domain relational calculus.

#### UNIT-V

Introduction to SQL languages. Formulation of queries in SQL Language and query by example.

#### SUGGESTED BOOKS

1. Martin James : Computer database organization, Second Edition, Prentice Hall of India Private Limited, New Delhi.
2. Date, C.J. : An introduction to database system, Third Edition, Vol. I, Narosa Publishing House, New Delhi.

3. Ulman J.D. : Principles of database management system, Second Edition, Galgotia Publishers Private Limited, New Delhi.
4. Awad E. : System Analysis and Design, Galgotia Publications Private Limited., New Delhi.
5. Clifton H.D. : System analysis for business data processing, Prentice Hall of India Private Limited, New Delhi.

## COMPUTER SCIENCE - III

### Course Code 5004-A12- III

## COMPUTER GRAPHICS

### UNIT-I

Geometry and line generation : points and lines, planes and coordinates, line segments, vector generation algorithms, pixels and frame buffer, character generation.

### UNIT-II

Graphic primitives : Display devices, display file structure and interpreters, device coordinates, polygons, interfacing algorithms, filling of polygons.

### UNIT-III

Transformation matrices : scaling, rotation and translation transformations, shear transformations, translations, display procedure.

### UNIT-IV

Segmentation : Segment creation, renaming, deletion, closing of segments, image transformations, saving and showing segments, windowing and viewing transformations, clipping of line and polygons.

### UNIT-V

Interactive devices : Introduction to positioning and pointing devices, principle and working of joy stick, light pen and mouse.

Introduction to 3D graphics : Geometrical, coordinate transformations, rotation about arbitrary axis, 2D projections : parallel and perspective projections, viewing parameters, special projection, introduction to 3d clipping and elementary algorithms.

### SUGGESTED READINGS

1. Harrington S., Computer Graphics : A programming approach, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Newman and Sproul, Principles of interactive computer graphics, Tata McGraw-Hill Publishing Company Limited.
3. Hearn D. and Baker, Computer graphics, 1993, Prentice Hall of India Private Limited.

## COMPUTER SCIENCE

### Course Code 5004-A12

## PRACTICALS

**Note :** Students are required to attempt two exercises one from each part.

### MARKS DISTRIBUTION

Part A	:	24
Algorithm and flowchart	:	8
Program Coding	:	8
Program execution, result and documentation	:	8
Part B	:	24
Algorithm and flow chart	:	8
Program coding	:	8
Program execution, result and documentation	:	8
Viva	:	12
Record	:	15

### PART-A

Numerical methods implementation using any programming language.

1. Program for addition, subtraction, multiplication of matrices.
2. Program to find transpose, inverse of matrix.
3. Program to test symmetry of matrix.
4. Program to find root of an equation by
  - a) Bisection method
  - b) False position method
  - c) Newton Raphson method.

5. Solution of differential equation by -
  - a) Runge Kutta method
  - b) Predictor corrector method
6. To solve simultaneous equations by
  - a) Gauss Siedel method
  - b) Gauss elimination method
7. To find integral of a function using
  - a) Trapezoidal method
  - b) Simpson method
8. To interpolate a function using Langrange's interpolation method.
9. To find complex roots of an equation using Bairstow's method.
10. To fit linear and exponential curves using least square fit method.

### **PART-B**

#### **PROGRAMMING IN C**

1. Simple program to show structure of C.
2. Program on various conditional and looping statements.
3. Programs on control statements.
4. Programs on single and multi-dimensional arrays.
5. Programs using functions.
6. Programs using enumerated data types.
7. Programs using structures, array of structures.
8. Programs on pointer data and applications.
9. Programs on processing of strings.
10. Programs on file processing.
11. Programs to plot line, circle and ellipse
12. Implementation of two dimensional transformation and clipping algorithm.

## **BOTANY - I**

**Course Code 5004-A13-I**

### **ALGAE, LICHENS AND BRYOPHYTES**

#### **UNIT-1**

General characters, thallus organisation, pigments and reserve food material in algae. Electron microscopic structure of Chlamydomonas 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 and reproduction in Phaeophyta: Ectocarpus ; Rhodophyta: Polysiphonia. Economic importance of algae. Recent advances in genetics of Chlamydomonas. 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 and Biological importance of Bryophytes. Recent Advances in Bryological research in India.

**SUGGESTED READINGS**

1. Ghewawat, M.S. Kapoor, J.N. and Narayan, H.A. : A Text book of Algae, Ramesh book Depot, Jaipur, 1976.
2. Vashishtha, B.R. : Botany For Degree Students (Algae, Fungi, Bryophyta and Gymnosperms), S. Chand and Co., New Delhi, 1976.
3. त्रिवेदी, पी.सी. , देवड़ा, जी.एस., शर्मा, विवेक, राठौड़, मोहनसिंह : वनस्पति विज्ञान, आर.बी.डी. पब्लिकेशन्स, जयपुर, नई दिल्ली

**BOTANY - II**

Course Code 5004-A13 - II

**MYCOLOGY, MICROBIOLOGY AND PLANT PATHOLOGY****UNIT-1**

Characteristics and broad classification of fungi with special reference to system proposed by Alexopolous and Mims. Recent developments in molecular systematics of fungi. Structure and life history of Albugo, Penicillium, Phyllactinia and Peziza. 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 reproduction of bacteria. Isolation and pure culture of bacteria, Gram's staining. Salient features of Microbiology of water, soil and food. Bacterial identification through molecular techniques.

**UNIT-4**

Characteristics, classification, structure and economic importance of Mycoplasma, Viruses: Nature, classification, structure, transmission and multiplication of plant viruses.

**UNIT-5**

Principles of plant pathology, Methods of plant disease management, Study of symptoms, causal organism, perpetuation, etiology and control measures of following plant diseases: 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 groundnut.

**SUGGESTED READING**

1. Sharma, P.D. : Fungi, Rastogi Publications, Meerut, 1989.
2. Sharma, P.D. : Microbiology and Plant pathology, Rastogi and Co. Meerut, 1989.
3. गेना, सी.बी. वर्मा, एम.एल. चौधरी, बी. एल. कवक, सूक्ष्म जैविकी व पादप रोग विज्ञान, अलका पब्लिकेशन्स, अजमेर

**BOTANY - III**

Course Code 5004-A13 - III

**PALAEOBOTANY, PTERIDOPHYTES  
AND GYMNOSPERMS****Unit-1**

Characteristics and broad classification of pteridophyta. Stellar 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. Recent advances in conifer somatic embryogenesis.

**SUGGESTED READINGS**

1. 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

## BOTANY

### Course Code 5004-A13

## 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, Peziza, 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 microscopic 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 pteridophytes: Psilotum,

Lycopodium, Selaginella, Equisetum and Marsilea. Study of temporary, single stained microscopic preparation of the following : Cone of Lycopodium, Selaginella and Equisetum. Petiole, Root and Sporocarp of Marsilea ; Rhizophore and Selaginella.

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.

### SUGGESTED READINGS

- Alexopoulos, 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.
- त्रिवेदी, पी.सी. , देवड़ा, जी.एस. शर्मा, विवेक : राठौड़ मोहन सिंह : वनस्पति विज्ञान, आर.बी.डी. पब्लिकेशन्स, जयपुर, नई दिल्ली
- गेना, सी.बी., वर्मा, एम.एल. चौधरी, बी.एल., कवक, सूक्ष्म जैविकी व पादप रोग विज्ञान, अलका पब्लिकेशन्स

## ZOOLOGY - I

Course Code 5004-A14 - I

### LIFE AND DIVERSITY OF ANIMALS-I (INVERTEBRATES)

#### UNIT-I

1. General characters and classification of phylum Protozoa upto orders with examples and their economic importance.
2. Type study - Paramecium, Plasmodium, Pathogenicity of Plasmodium.
3. Parasitic Protozoans : Pathogenesis and morphology of Entamoeba histolytica, Trichomonas vaginalis, Leishmania tropica, Trypanosoma gambiense.

#### UNIT-II

1. General characters and classification of phylum. Porifera upto orders with examples and their economic importance.
2. Type study - Sycon
3. Canal system in sponges.
4. General characters and classification of phylum. Coelenterata upto orders with examples.
5. Type study - Metridium.
6. Corals and coral reefs - their formation, kinds and importance. Polymorphism in Coelenterates, Metagenesis.

#### UNIT-III

1. General characters and classification of phylum Platyhelminthes and Aschelminthes upto orders with examples.
2. Type study - Fasciola hepatica, Ascaris lumbricoides.
3. Helminth parasites in relation to human diseases, parasitic adaptations of trematodes, cestodes and nematodes.

#### UNIT-IV

1. General characters and classification of phylum Annelida and Arthropoda upto orders with examples.
2. Type study - Nereis, Palaemon, Schistocerca.
3. Metamerism, pseudocoelom, trochophore larva.
4. Mouth parts of insects.

#### UNIT-V

1. General characters and classification of phylum-Mollusca, Echinodermata and Hemichordata upto orders with examples.
2. Type study - Pila, Asterias, Balanoglossus.
3. Echinoderm Larvae; Affinities of Hemichordata.

#### SUGGESTED READINGS

- Animal Diversity & Evolution, Kohli, Sahni and Bhatia, RBD Publishing House
- Invertebrates structure and functions, Kohli, Sahni & Trigunayat, RBD Publishing house
- अकशेरुकी संरचना एवं प्रकार, कोहली, त्रिगुणायत, आर. बी. डी. प्रकाशन

## ZOOLOGY - II

### Course Code 5004-A14 - II

## CELL BIOLOGY

### UNIT-I

1. The cell : Discovery of Cell, Basic properties of Cell, Diversity of cell size and shape, cell theory.
2. Prokaryotic Cell : Characteristics and Structure.
3. Cellular Macromolecules : Proteins, Carbohydrates, Lipids.

### UNIT-II

1. Centrioles and Basal bodies.
2. Cilia and Flagella.
3. Cytoplasmic skeleton : Microfilaments and Microtubules.
4. Plasma Membrane : Fluid mosaic model, functions of plasma membrane viz. Endo- and Exocytosis, active and passive transport.

### UNIT-III

1. Shape, size, distribution, chemical nature and functions of following :
  - (a) Endoplasmic reticulum
  - (b) Golgi complex
  - (c) Lysosomes
  - (d) Mitochondria

### UNIT-IV

1. Nucleus and nucleolus : Structure, Chemical Nature and Functions.
2. Nucleic acids : Watson and Crick model of DNA, Chemical nature of DNA, Types of DNA, Replication of DNA, Different

types and chemical nature of RNA; Ribosomes.

3. Elementary Knowledge of Protein Synthesis.

### UNIT-V

1. Brief idea of cell cycle, General description of mitosis and meiosis.
2. An elementary idea of cell transformation and cancer.
3. An elementary idea of cellular basis of immunity.
4. Methods in Cell Biology :
  - (a) Elementary idea of techniques in cell biology : Light, electron and fluorescence microscopy.
  - (b) Elementary idea of cell culture.

### SUGGESTED READINGS

- Cell Biology and Genetics, Bhatia, Kohli & Jain, RBD Publication House
- कोशिका जैविकी एवं आनुवंशिकी भाटिया, कोहली एवं जैन, आर.बी.डी. प्रकाशन डीपो।

## ZOOLOGY - III

Course Code 5004-A14 - III

### DEVELOPMENTAL BIOLOGY

#### UNIT-I

1. Aim and Scope of developmental biology. Historical review and concepts of Embryology.
2. Sexual and asexual reproduction.
3. Neuroendocrine regulation of reproductive organs (hypothalamo-hypophysial axis only).

#### UNIT-II

1. Gametogenesis : Spermatogenesis and structure of sperm, oogenesis and structure of ovum, type of ova.
2. Fertilization : Events of fertilization, mechanism of sperm transfer, polyspermy and its preventive mechanisms.
3. Errors in fertilization and significance of fertilization.
4. Parthenogenesis.

#### UNIT-III

1. Cleavage : Patterns and planes of cleavage.
2. Blastulation : Types of blastula.
3. Gastrulation : Types, mechanism, fate maps, morphogenetic cell movements and their significance in gastrulation.

#### UNIT-IV

1. Elementary knowledge of primary organizer.
2. Embryonic induction, concept of competence.
3. Determination, differentiation and growth.
4. Regeneration.

#### UNIT-V

1. Extra embryonic membranes : Development and functions.
2. Placentation : Definition, types, classification on the basis of morphology and histology. Functions of placenta.

#### SUGGESTED READINGS

- Development Biology, Asha Sharma, RBD Publishing House.
- परिवर्धन जैविकी, आशा शर्मा एवं चेतन कुमार शर्मा, आर बी डी प्रकाशन डिपो।

## ZOOLOGY

Course Code 5004-A14

### PRACTICALS

S.No.	Exercise	Regular	Ex-Students
1.	Diagram / Labelling	18	25
2.	Cell Biology / Developmental Biology Exercise	09	12
3.	Mounting / Slide Preparation	08	08
4.	Spots (10)	20	10
6.	Record	10	--
	Total	75	75

1. General survey of invertebrates (museum specimens):

The student is required to know classification, habit and habitat, economic importance etc.

- |                                      |   |   |
|--------------------------------------|---|---|
| A. Protozoa                          | : | Entamoeba, Polystomella, Monocystis, Euglena, Noctiluca, Leishmania, Trichomonas, Trypanosoma, Nyctotherus, Paramecium, Vorticella, various stages of Plasmodium. |
| B. Polnera                           | : | Scypna, Hyalanema, Euplectella, Spongilla, Euspongia.   |
| C. Coelenterata                      | : | Physalia, Porpita, Aurelia, Rhizostoma, Alcyontum, Corallium, Gorgoria, Pennatula, Madrepora, Metridium.  |
| D. Platyhelminthes and Aschelminthes | : | Dugesia, Fasciola, Taenia, Schistosoma, Drocunculus, Ascaris (male and female), Wucheraria, Enterobius.   |
| E. Annelida                          | : | Nereis, Heteronereis, Aphrodite, Arenicola,   |

- Chaetopterus, Pontodella, Hirudinaria, Pheretima.
- F. Onychophora : Peripatus
- G. Arthropoda : Palaemon, Limulus, Aranea, Palamnaeus, Lepas, Balanus, Apus, Sacculina, Eupagurus, Carcinus, Lepisma, Pediculus, Schistocerca, Bombyx, Xenopsylla, Apis, Climex, Julus, Scolopendra, Ixodes, Sarcoptes, Cyclops.
- H. : Turbinella, Laviculus, Patella, Limax, Helix, Doris, Aplysia, Dentalium, Nautlus, Sepia, Octopus, Loligo, Pectren, Solen, Pila, Pinctada.
- I. Echinodermata: Asterias, Pentaceros, Antedon, Ophiothrix, Holothuria.
- J. Hemichordata : Balanoglossus, Saccoglossus.

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

1. Protozoa : Blood smears showing malarial parasite. Paramecium : Binary fission, conjugation.
2. Porifera : T.S. and L.S. of Sycon, spicules, spongin fibres and gemmules.
3. Coelenterata : Obelia (colony and medusal) 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 larvae.
9. Echinodermata: T.S. of arm, tube feet and pedicellaria, bipinnaria larva of starfish, echinopluteus larva.
10. Hemichordata : Tornaria larva.

**Diagram / Labelling of internal anatomy of the following animal.**

1. Pheretima : General anatomy, alimentary canal, nervous, excretory and reproductive systems.
2. Palaemon : Appendages, general anatomy, alimentary canal and nervous system.
3. Periplaneta : General anatomy, alimentary canal, nervous system and reproductive systems.
4. Pila : Organs of pallial complex nervous system.

**IV. Mountings : Permanent preparation of the following :**

1. Protozoa : Euglena, Paramecium, radiolarians, Polystomella.
2. Porifera : Sponge spicules, spongin fibres and gemmules.
3. Coelenterata : Obelia (colony and medusal).
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 plan of prawn, salivary glands and tracheae of cockroach W.M. of Cyclops, Daphnia, mouth parts of any 4 insects Culex, Anopheles male and female, housefly, cockroach and honey bee.
7. Mollusca : Gill lamella, glochidium larva, osphradium and radula of Pila.

### CELL BIOLOGY

1. Prepared slides of mitochondria, Golgi bodies, centrosome, different stages of mitosis.
2. Buccal smear preparation for localization of mitochondria and Golgi complex using vital stains.
3. Demonstration of chromosomes in the buds of Tradescantia / Aloe vera and in root tips of Allium cepa.
4. Squash preparation of polytene chromosomes.

### DEVELOPMENTAL BIOLOGY

1. W.M. of eggs, early cleavage stage, T.S. of blastula and gastrula of frog.
2. Study of chick embryo : 18 hours, 24 hours, 36 hours, 48 hours and 72 hours.
3. T.S. of ovary and testis.
4. Sperm smear to study the structure of sperm.
5. Foetus and placenta.
6. Virtual dissections

## CULTURAL AND LITERARY DEVELOPMENT OF LEARNERS

Course Code 5005 - 1

### OBJECTIVES

1. To search hidden talent of pupil-teachers.
2. To develop their self-confidence.
3. To become more creative in their ideas and work.
4. To a true sportsman spirit is develop.
5. To become efficient in team work.
6. To develop in better co-ordination and understanding among pupil-teacher.

### ACTIVITIES

1. Talent Search
2. Welcome Celebration
3. Solo Song
4. Duet Song
5. Solo Dance
6. Pair Dance
7. Nail Art
8. Mehandi
9. Rangoli
10. Debate
11. Poster Making
12. Essay Writing
13. Extemporary
14. Fancy Dress
15. Without Gas Cooking
16. Annual Function

# MEDITATION, YOGA AND SPORTS - 1

Course Code 5005 - 1

## OBJECTIVES

To enable the Student teachers to -

1. Know the Meaning of various Yoga Asanas and to apply in their life.
2. Understand the importance of good posture and postural deformities.
3. To Create interest for the practical of yogasanas and Meditation through which they learn the skill/ art of self control, Control fatigue of routine life.

## UNIT - I : ASANS

1. Asana - (Definition & Classification) Different types of Asana. padmasana, Vajarasana, Tadasana, Naukasana, Bhujangasana, Salabhasana, Sarvangasana, Savasana, Makasana, Pranam Mukthasana mandkasana mayurasana, vakasana

## UNIT - II PRANAYAMS

Definition, Different types of pranayam.

- A. Anulom-Vilom B. Bramari C. Bhastrika

## UNIT - III : MEDITATION

## UNIT - IV : BANDHAS

- A. Jalandhar B. Uddiyan C. Mool Bandha

## UNIT - V : ATHLETICS - ALL ATHLETICS ACTIVITIES

## REFERENCE BOOKS:-

1. J.C. Aggarwal : Health and physics Education, Shipra Publications
2. Anjana Daul (2014) : Yoga Education, New Delhi APH publishing Corporation.
3. R.C. Sharma & Daur. M : An Introduction to Health and physical Education, Tandon publications.
4. Arun Dumar (2011) : Yoga Education (Hindi) Patiyala : Twenty First Country publications.
5. सुनील कुमार व्यास : योग शिक्षा, दिल्ली, खेल साहित्य केन्द्र

## Student's Responsibilities of Learning

Appreciate the institutional goals and objectives and contribute to their realisation by participating in relevant institutional activities.

Have a clear knowledge of the programmes, admission policies, rules and regulations of the institution.

Understand the teaching-learning strategies and evaluation systems of the institution.

Follow the time schedules, rules and regulations of the institution.

Undertake regular and intense study of learning materials.

Make optimum use of the learning resources and other support services available in the institution.

Prepare for continuous internal assignments and term-end examinations.

Give feedback for system improvement.

Have faith and ability to pursue life-long learning.

Live as worthy alumni of the institution.

॥ सरस्वतीं देवयन्तो हवन्ते ॥

Janardan Rai Nagar Rajasthan Vidyapeeth  
**MANIKLAL VERMA SHRAMJEEVI COLLEGE**

(Accredited 'A' Grade by National Assessment and Accreditation Council)

Town Hall, Udaipur - 313001

Tel : -

Email :



**Faculty of Education**  
**Bachelor of Education (B.A. B.Ed./B.Sc. B.Ed.)**  
**Integrated Course**

॥ सरस्वतीं देवयन्तो हवन्ते ॥

**Janardan Rai Nagar Rajasthan Vidyapeeth  
(Deemed) University**

(Accredited 'A' Grade by National Assessment and Accreditation Council)

# **SYLLABUS**

For

**B.A. B.Ed. / B.Sc. B.Ed.  
Integrated Course**



**(I Year)**

**MANIKLAL VERMA SHRAMJEEVI COLLEGE**

Town Hall, Udaipur - 313001 Tel : - 0294-000000 Email :