

FACULTY OF EDUCATION
Maa Vindhyavasini University,
Mirzapur

DEPARTMENT OF EDUCATION



Syllabus of
4 year Integrated
B.A-B.Ed, B.Sc-B.Ed.
Programme M.V.V.U. Mirzapur
Approved By Board of
Studies 2026-27

[Signature]
11.05.2026

Rules, Regulations & Curriculum
4th Year Integrated B.A.B.Ed./B.Sc.B.Ed. Programme

(Semester Wise)
w.e.f. Session 2026-27

[Signature]

4 YEARS (B.A.B.Ed./B.Sc.B.Ed.) INTEGRATED COURSE

The purpose of four year (B.A.B.Ed./B.Sc.B.Ed.) Integrated Course is to prepare competent and committed teachers who would be able to function effectively at school level notwithstanding the scope for pursuing Higher Education Programmes in any of the streams Science/Humanities/Social Science/Pedagogy after completion of the Integrated Course as formulated hereunder:

Objectives

The course aims at enabling the student teacher to-

- acquire competencies in respect of Science / Humanities / Social Science discipline for teaching subjects on the basis of accepted principles of learning and teaching.
- develop Skills, understanding, interests and attitude which enable him/her to become effective teacher for the emerging new educational scenario.
- develop skills in identifying, selecting, innovating and organizing learning experiences for teaching the required subjects.
- acquire competence in organizing programmes based on Constructivist Paradigm and Experiential Learning.
- develop understanding of Educational, Psychological, Sociological, Administrative and Managerial aspects of schools.
- understand theoretical and practical aspects of values, health, environmental and recreational activities.
- to promote needed professionalization for becoming competent teachers rooted in moral ethics and values.
- to inculcate the Samsakarasa for integration of knowledge and skills leading to the preparation of effective teachers for the 21st century.

Eligibility for Admission



B.A. B.Ed.

Candidates seeking admission to B.A. B.Ed. programme should have passed +2 from recognized Board/University or an equivalent examination with 50% marks in the aggregate. Relaxation upto 5% of marks shall be given to the SC/ST candidates.

B.Sc. B.Ed.

Candidates seeking admission to the B.Sc. B.Ed. programme should have passed in science stream +2 from recognized Board/University or an equivalent examination with 50% marks in the aggregate. Relaxation upto 5% of marks shall be given to the SC/ST candidates.

Admission Procedure

Admission shall be made on merit on the bases of marks obtained in the qualifying examination and in the entrance examination or any other selection process as per the policy of the state government/university.

Duration

The duration of (B.A. B. Ed. / B.Sc. B.Ed.) Course will be of eight semesters ranging over a period of 4 years including intensive job training programmes. The first semester will be from July to December. While the second semester will be from January to May of the academic session concerned. The remaining subsequent semesters will be scheduled following this pattern.

Working Days

There shall be at least two hundred working days each years exclusive of the period of examination and admission.

Fees

The institution shall charge only such fees as in prescribed by the affiliating body/state government.

Medium



The medium of instruction and examination for (B.A. B. Ed. / B.Sc. B.Ed.) Course will be Hindi/ English.

Eligibility for Appearing (B.A. B. Ed. / B.Sc. B.Ed.) Examination

(a) Attendance in

- I. The minimum attendance shall have to be 80% for all course and practicum.
- II. The Head of the Department will, however, have discretion to condone deficiency in attendance to the extent of 10% for valid reasons.
- III. The Vice-Chancellor may consider the question of condoning deficiency in attendance, not covered under clause (ii) above, if he is satisfied on merits of each individual case.

(b) Evaluation and Scale of Gradation

- 1- In each semester the two types of evaluation will be carried out – Formative and Summative. There will be two formative and one summative tests in each semester. Formative Tests will take into account the Sessional Assessment /Unit Test /Grading as prescribed from time to time.
- 2- Summative Tests will be conducted towards the end of each semester. In order to be eligible for automatic promotion to subsequent semester the candidate should have cleared all the prescribed papers / courses and should obtained atleast 40% marks or atleast a D grade on a 5 point scale on both formative and summative tests conducted in a semester.
- 3- The distribution of marks / grading in a semester will be regulated as follows:

Percentage of Marks	Categorization	Grading
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75% and above	Outstanding (Distinction)	A
60% and above but below 75%	Very Good (First Div)	B
50% and above but below 60%	Good (Second Div)	C
40% and above but below 50%	Average (Pass)	D
Below 40%	Not Satisfactory (Fail)	E

- 4- A student who obtains E grade in two or more than two papers in a semester will be required to repeat the entire semester whereas a student obtaining E grade in just one paper will be given the facility for re-appear in the same paper at the time of subsequent semester examination. The re-appear facility will not be allowed more than two for a particular paper.
- 5- The final categorization / grading will be done by averaging the marks/grades obtained by a candidate in all the eight semesters including pedagogy related papers / courses. The pattern of classification or grading will be as indicated in paragraph b (3).
- 6- The evaluation for both general and professional courses (B.A.B.Ed/ B.Sc.B.Ed. Integrated) will be reflected with a final grade or marks earned by a candidate in all the semesters. However, the evaluation for Pedagogy related course shall also be reflected separately for theory and practicals in order to enable the students to pursue higher level courses in Pedagogy. The same pattern may be followed for B.A/B.Sc. component of the programme with a view to enabling students to seek admissions in higher education courses of the concerned disciplines.
- 7- For practical evaluation two external examiner will be appointed one member from university other than M.G. Kashi Vidyapith and other member from within the university but not the same college where evaluation is conducted.
- 8- The examiner from both theory and practical shall be appointed from a

panel of examiners prepared by Board of Studies in Education.

- 9- It will be at the discretion of the Head/Department to forward or reject the Examination Form, if the student fails to comply with the essential requirements in respect of Attendance, Project and Practical work and general demeanor.
- 10- For the supervision of teaching practices, community work and practical examination partial allowance and reimbursement of expenditure for travel etc will be allowed on the basis of the rates, approved by The Vice Chancellor for university department and Management authority designated for college. For university department finance officer will provide the required amount to the Head of Department at least two week in advance.



Course Structure of Integrated B.A. B.Ed.

The student opting for B.A. B.Ed. shall be required to choose three subjects from the list given below in addition to the compulsory subjects pedagogy related courses.

Note- Select any three subjects maximum two subjects from a group.

Group A- Hindi, English, Sanskrit

Group B- Psychology, Sociology, Philosophy, History

Group C- Political Science, Economics, Geography

SEMESTER-I

S.No.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Hindi हिन्दी	101	प्राचीन काव्य	100	4
2	English अंग्रेजी	101	Poetry	100	4
3	Sanskrit संस्कृत	101	नाटक, छन्द एवं अलंकार	100	4
4	Psychology मनोविज्ञान	101	Basic Psychological Process मनोवैज्ञानिक प्रक्रियाओं के मूल आधार	75	3
5	Sociology समाजशास्त्र	101	Introduction to Sociology समाजशास्त्र का परिचय	100	4
6	Philosophy दर्शन	101	Indian Philosophy भारतीय दर्शन	100	4
7	History इतिहास	101	History of India (1206-1739) भारत का इतिहास (1206-1739)	100	4
8	Political Science राजनीति विज्ञान	101	Political Theory राजनीतिक सिद्धान्त	100	4
9	Economic अर्थशास्त्र	101	Principles of Economic Analysis आर्थिक विश्लेषण के सिद्धान्त	100	4
10	Geography भूगोल	101	Physical Geography भौतिक भूगोल	75	3
	Pedagogy Related (B.Ed.)	101	Philosophical Dimensions & Challenges of Education शिक्षा के दार्शनिक आयाम एवं चुनौतियाँ	100	4

SEMESTER-II

S.No.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Hindi हिन्दी	201	आधुनिक गद्य साहित्य	100	4
2	English अंग्रेजी	201	Prose	100	4
3	Sanskrit संस्कृत	201	काव्य एवं व्याकरण	100	4
4	Psychology मनोविज्ञान	201	Human Development मानव विकास	75	3 (2P)
			Practical	50	
5	Sociology समाजशास्त्र	201	Society in India: Structure and Change भारत में समाज : संरचना और परिवर्तन	100	4
6	Philosophy दर्शन	201	Modern Western Philosophy आधुनिक पाश्चात्य दर्शन	100	4
7	History इतिहास	201	The Rise of Modern Western Thought (1453-1789) आधुनिक पश्चिमी चिन्तन का अभ्युदय (1453-1789)	100	4
8	Political Science राजनीति विज्ञान	201	National Movement & Constitution of India राष्ट्रीय आंदोलन और भारत का संविधान	100	4
9	Economic अर्थशास्त्र	201	Indian Economic Problems भारतीय आर्थिक समस्याएँ	100	4
10	Geography भूगोल	201	Human Geography मानव भूगोल	75	3 (2P)
			Practical	50	
	Pedagogy Related (B.Ed.)	201	Psychological Dimensions of Education शिक्षा के मनोवैज्ञानिक आयाम	100	4

SEMESTER-III

S.No.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Hindi हिन्दी	301	आधुनिक काव्य	100	4
2	English अंग्रेजी	301	Drama	100	4
3	Sanskrit संस्कृत	301	वेद, व्याकरण एवं अनुवाद	100	4
4	Psychology मनोविज्ञान	301	Psychopathology मनोविकृति विज्ञान	75	3
5	Sociology समाजशास्त्र	301	Indian Society: Issues and Problems भारतीय समाज : मुद्दे और समस्याएँ	100	4
6	Philosophy दर्शन	301	Ethics नीतिशास्त्र	100	4
7	History इतिहास	301	History of India (1740-1947) भारत का इतिहास (1740-1947)	100	4
8	Political Science राजनीति विज्ञान	301	An Outline History of Western Political Thought पाश्चात्य राजनीतिक चिन्तन की रूपरेखा	100	4
9	Economic अर्थशास्त्र	301	National Income Analysis, Money and Banking राष्ट्रीय आय विश्लेषण, मुद्रा एवं बैंकिंग	100	4
10	Geography भूगोल	301	Economic Geography आर्थिक भूगोल	75	3
	Pedagogy Related (B.Ed.)	301	Educational Management and leadership शैक्षिक प्रबन्धन एवं नेतृत्व	100	4
		302	Educational Measurement and Evaluation शैक्षिक मापन एवं मूल्यांकन	100	4

SEMESTER-IV

S.No.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Hindi हिन्दी	401	हिन्दी साहित्य का इतिहास	100	4
2	English अंग्रेजी	401	Fiction	100	4
3	Sanskrit संस्कृत	401	काव्य एवं कवि-परिचय	100	4
4	Psychology मनोविज्ञान	401	Social Psychology समाज विज्ञान	75	3 (2P)
			Practical	50	
5	Sociology समाजशास्त्र	401	Social Change and Social Control सामाजिक परिवर्तन एवं सामाजिक नियन्त्रण	100	4
6	Philosophy दर्शन	401	Logic तर्कशास्त्र	100	4
7	History इतिहास	401	History of Modern Europe (1789-1919) आधुनिक यूरोप का इतिहास (1789-1919)	100	4
8	Political Science राजनीति विज्ञान	401	Comparative Government तुलनात्मक सरकार	100	4
9	Economic अर्थशास्त्र	401	Public Finance and International Trade लोक वित्त एवं अन्तर्राष्ट्रीय व्यापार	100	4
10	Geography भूगोल	401	Geography of India भारत का भूगोल	75	3 (2P)
			Practical	50	
	Pedagogy Related (B.Ed.)	401	Action Research in Education शिक्षा में क्रियात्मक अनुसंधान	100	4
		402	Environmental Education पर्यावरण शिक्षा	100	4

SEMESTER-V




S.No.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Hindi हिन्दी	501	साहित्य सिद्धान्त और आलोचना	100	4
2	English अंग्रेजी	501	History of English Literature	100	4
3	Sanskrit संस्कृत	501	काव्य	100	4
4	Psychology मनोविज्ञान	501	Psychological Assessment & Statistics मनोवैज्ञानिक मूल्यांकन एवं सांख्यिकी	75	3
5	Sociology समाजशास्त्र	501	Foundations of Sociological Thought समाजशास्त्रीय चिन्तन के आधार	100	4
6	Philosophy दर्शन	501	Problems of Philosophy (Indian & Western) दर्शन की समस्याएँ (भारतीय एवं पाश्चात्य)	100	4
7	History इतिहास	501	Indian National Movement (1857-1947) भारतीय राष्ट्रीय आन्दोलन (1857-1947)	100	4
8	Political Science राजनीति विज्ञान	501	Principles of Public Administration लोक प्रशासन के सिद्धान्त	100	4
9	Economic अर्थशास्त्र	501	Economics of the Less Developed Countries अल्प विकसित देशों का अर्थशास्त्र	100	4
10	Geography भूगोल	501	Geographical thought भौगोलिक चिन्तन	75	3
	Pedagogy Related (B.Ed.)	501	Educational Technology शैक्षिक तकनीक	100	4

SEMESTER-VI

S.No.	Name of	Paper	Course Title	Marks	Credits
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	Subject	Code			
1	Hindi हिन्दी	601	भाषा विज्ञान एवं हिन्दी भाषा	100	4
2	English अंग्रेजी	601	Indian English Literature	100	4
3	Sanskrit संस्कृत	601	काव्यशास्त्र, व्याकरण एवं निबंध	100	4
4	Psychology मनोविज्ञान	601	Systems of Psychology मनोविज्ञान की पद्धतियाँ	75	3 (2P)
			Practical	50	
5	Sociology समाजशास्त्र	601	Social Research Methods सामाजिक अनुसन्धान की पद्धतियाँ	100	4
6	Philosophy दर्शन	601	Philosophy of Religion धर्म दर्शन	100	4
7	History इतिहास	601	Cultural and Economic History of India (1206-1900) भारत का सांस्कृतिक एवं आर्थिक इतिहास (1206-1900)	100	4
8	Political Science राजनीति विज्ञान	601	Indian Political Thought भारतीय राजनीतिक चिन्तन	100	4
9	Economic अर्थशास्त्र	601	Economic Policy of India भारत की आर्थिक नीति	100	4
10	Geography भूगोल	601	Environmental Studies पर्यावरण अध्ययन	75	3 (2P)
			Practical	50	
Practical (B.Ed.)				100	4
1. Micro Teaching- at least 8 skills. सूक्ष्म शिक्षण- कम से कम 8 कौशल।				25	
2. Action Research Project- Based on School/Class/Community Problem. क्रियात्मक अनुसंधान योजना- विद्यालय/कक्षा/सामुदायिक समस्याओं पर आधारित।				20	
3. Use of ICT and development of power point presentation (PPT) including improvisation of teaching aids. सूचना एवं सम्प्रेषण तकनालजी का अनुप्रयोग तथा पावर प्वाइंट प्रस्तुतियों का विकास जिसमें शिक्षण उपकरणों का निर्माण भी शामिल है।				20	
4. Personality development with emphasis on- Communication skill including language use and improvement of speech.				15	

व्यक्तित्व विकास- सम्प्रेषण कौशल (भाषा प्रयोग एवं वाक् सुधार सहित) पर बल देते हुए। 5. Internship - I (4 weeks) School visit: (primary/upper primary/ secondary) and preparation of status report about various facilities provided in the school. विद्यालय भ्रमण : प्राथमिक/उच्च प्राथमिक/माध्यमिक विद्यालय एवं विद्यालयों में उपलब्ध विभिन्न संसाधनों की एक रिपोर्ट तैयार करना।	20	
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SEMESTER VII

701- Pedagogy of School Subject – 1 विषय शिक्षण-1 100 4

702 -Pedagogy of School Subject – 2 विषय शिक्षण-2 100 4

Pedagogy of School Subjects – Paper Code 701 and 702

Pedagogy of two school subject have to be selected from the following groups in which only one subject is to be selected from each group:

निम्नलिखित संवर्गों में से किन्हीं दो विषयों का चयन करना है जिसमें एक संवर्ग से एक ही विषय का चयन करना है :

Group A	Group B
1. Hindi teaching हिन्दी शिक्षण	1. History teaching इतिहास शिक्षण
2. Sanskrit teaching संस्कृत शिक्षण	2. Geography teaching भूगोल शिक्षण
3. English teaching अंग्रेजी शिक्षण	3. Civics teaching नागरिक शास्त्र शिक्षण
	4. Economics teaching अर्थशास्त्र शिक्षण

Practical (B.Ed.)-

Internship -II (16 weeks) (School Attachment) 200 Marks (8 Credits)

1. Participation in school chores such as prayers, assembly, organization of co-curricular activities etc. 10 Marks

विद्यालयी क्रियाकलापों यथा प्रार्थना, दैनिक सभा एवं पाठ्यक्रम सहगामी क्रियाओं के आयोजन में प्रतिभाग।

2. Practice teaching-30 lesson each subject total 60 lesson, supervised by B.Ed. faculty. 80+80= 160 Marks

शिक्षण अभ्यास- बी०एड० पर्यवेक्षकों के निर्देशन में प्रत्येक विषय से 30 पाठ कुल 60 पाठ।

3. Community work सामुदायिक कार्य 10 Marks

4. Scouting and Guiding -Under the guidance of an authorized trainer with certificate. 10 Marks

स्काउटिंग एवं गाइडिंग- प्राधिकृत प्रशिक्षक के निर्देशन में प्रमाण पत्र सहित

5. Yoga Education – Under the guidance of a formally trained yoga expert with certification from the concerned institution. 10 Marks

योग शिक्षा- औपचारिक रूप में प्रशिक्षित योग विशेषज्ञ के निर्देशन में प्रमाण पत्र सहित।

SEMESTER-VIII

S.No.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Hindi हिन्दी	801	उपन्यास, कहानी एकांकी तथा अन्य लघु गद्य विद्याएं	100	4
2	English अंग्रेजी	801	New Literatures in English	100	4
3	Sanskrit संस्कृत	801	भारतीय दर्शन एवं संस्कृति	100	4
4	Psychology मनोविज्ञान	801	Organizational Behaviour संगठनात्मक व्यवहार	100	4
5	Sociology समाजशास्त्र	801	Pioneers of Indian Sociology भारतीय समाजशास्त्र के अग्रतर विचारक	100	4
6	Philosophy दर्शन	801	Social and Political Philosophy सामाजिक एवं राजनैतिक दर्शन	100	4
7	History इतिहास	801	History of Modern World (1920-1947) आधुनिक विश्व का इतिहास (1920-1947)	100	4
8	Political Science राजनीति विज्ञान	801	International Politics अन्तर्राष्ट्रीय राजनीति	100	4
9	Economic अर्थशास्त्र	801	Quantitative Methods परिमाणात्मक विधियाँ	100	4
10	Geography भूगोल	801	Regional studies of any one of the following regions (A) South West Asia दक्षिण पश्चिम एशिया (B) South East Asia दक्षिण पूर्व एशिया (C) Far East Asia सुदूर पूर्व एशिया	100	4
	Pedagogy Related (B.Ed.)	801 & 802	Any two of the following elective papers (specialization) A. Human Rights, Non Violence and Peace Education मानवाधिकार, अहिंसा एवं शांति शिक्षा B. Special Education	100 100	4 4

			विशिष्ट शिक्षा C. Elementary Education प्राथमिक शिक्षा D. Educational and Vocational Guidance शैक्षिक एवं व्यावसायिक निर्देशन E. Value Education मूल्य शिक्षा		
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Signature

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Course Structure of Integrated B.Sc. B.Ed.

In the B.Sc. B.Ed. integrated programme the students will be required to choose from one of the following science streams in addition to the compulsory subject-pedagogy related courses.

Science stream 1: Physics, Chemistry, Mathematics/Statistics

Science stream 2: Botany, Zoology, Chemistry

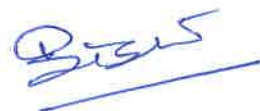
The course/paper lay out for all the eight semesters in displayed in table.

SEMESTER-I

S.N.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Physics	101	Mechanics and Relativity	50	4(2P)
		102	Mechanical Properties of Matter	50	
		Practical		50	
2	Chemistry	101	Structure and Bonding	50	4(2P)
		102	Organic Chemistry	50	
		Practical		50	
3	Mathematics	101	Matrix Algebra	50	6
		102	Differential Calculus	50	
		103	Integral Calculus	50	
4	Zoology	101	Systematics and Animal Diversity	50	4(2P)
		102	Animal form and function	50	
		Practical		50	
5	Botany	101	Cryptogams-I	50	4(2P)
		102	Cryptogams-II	50	
		Practical		50	
6	Statistics	101	Statistical Methods	50	4(2P)
		102	Probability	50	
		Practical		50	
	Pedagogy Related (B.Ed.)	101	Philosophical Dimensions and Challenges of Education	100	4

SEMESTER-II

S.N.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Physics	201	Thermal Physics-I	50	4(2P)
		202	Thermal Physics-II	50	
		Practical		50	
2	Chemistry	201	Inorganic Chemistry-I	50	4(2P)
		202	Physical Chemistry-I	50	
		Practical		50	
3	Mathematics	201	Statics and Dynamics	50	6
		202	Algebra	50	
		203	Multivariable Calculus	50	
4	Zoology	201	Cell Biology	50	4(2P)
		202	Biochemistry	50	
		Practical		50	
5	Botany	201	Microbiology and Plant Pathology	50	4(2P)
		202	Cytology and Genetics	50	
		Practical		50	
6	Statistics	201	Descriptives Statistic	50	4(2P)
		202	Distribution Theory	50	
		Practical		50	
	Pedagogy Related (B.Ed.)	201	Psychological Dimensions of Education	100	4



SEMESTER-III

S.N.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Physics	301	Optics-I	50	4(2P)
		302	Optics-II	50	
		Practical		50	
2	Chemistry	301	Organic Chemistry-II	50	4(2P)
		302	Physical Chemistry-II	50	
		Practical		50	
3	Mathematics	301	Differential Equation	50	6
		302	Tensor and Geometry	50	
		303	Partial Differential Equations	50	
4	Zoology	301	Comparative Physiology and Developmental Biology	50	4(2P)
		302	Endocrinology	50	
		Practical		50	
5	Botany	301	Phanerogams-I	50	4(2P)
		302	Phanerogams-II	50	
		Practical		50	
6	Statistics	301	Statistical Inference	50	4(2P)
		302	Sample Surveys and Design of Experiments	50	
		Practical		50	
	Pedagogy Related (B.Ed.)	301	Educational Management and leadership	100	4
		302	Educational Measurement and Evaluation	100	4

SEMESTER-IV

S.N.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Physics	401	Electromagnetic Theory	50	4(2P)
		402	Basic Electronics	50	
		Practical		50	
2	Chemistry	401	Inorganic Chemistry-II	50	4(2P)
		402	Selected Topics in Chemistry	50	
		Practical		50	
3	Mathematics	401	Mathematical Methods	50	6
		402	Abstract Algebra	50	
		403	Programming C	50	
4	Zoology	401	Evolution and Animal Behaviour	50	4(2P)
		402	Genetics	50	
		Practical		50	
5	Botany	401	Ecology	50	4(2P)
		402	Plant Physiology and Biochemistry	50	
		Practical		50	
6	Statistics	401	Applied Statistics	50	4(2P)
		402	Statistical Inference and Decision Theory	50	
		Practical		50	
	Pedagogy Related (B.Ed.)	401	Action Research in Education	100	4
		402	Environmental Education	100	4

SEMESTER-V

S.N.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Physics	501	Mathematical Physics	50	4(2P)
		502	Solid State Physics	50	
		Practical		50	
2	Chemistry	501	Analytical Chemistry-I	50	4(2P)
		502	Inorganic Chemistry-III	50	
		Practical		50	
3	Mathematics	501	Analysis-I	50	6
		502	Differential Geometry	50	
		503	Discrete Mathematics	50	
4	Zoology	501	Functional Anatomy and Economic Importance of Non-Chordates-I	50	4(2P)
		502	Functional Anatomy and Economic Importance of Non-Chordates-II	50	
		Practical		50	
5	Botany	501	Cryptogams-I	50	4(2P)
		502	Cryptogams-II	50	
		Practical		50	
6	Statistics	501	Programming with C	50	4(2P)
		502	Operations Research	50	
		Practical		50	
	Pedagogy Related (B.Ed.)	501	Educational Technology	100	4

SEMESTER-VI

S.N.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Physics	601	Quantum Mechanics	50	4(2P)
		602	Electronic Devices and Circuits	50	
		Practical		50	
2	Chemistry	601	Organic Chemistry-III	50	4(2P)
		602	Physical Chemistry-III	50	
		Practical		50	
3	Mathematics	601	Computational Mathematics Lab-I	50	6
		602	Analysis-II	50	
		603	Operations Research	50	
4	Zoology	601	Mammalian Endocrinology and Developmental Biology	50	4(2P)
		602	Mammalian Physiology	50	
		Practical		50	
5	Botany	601	Plant Ecology	50	4(2P)
		602	Plant Metabolism Biochemistry and Biotechnology	50	
		Practical		50	
6	Statistics	601	Numerical Methods	50	4(2P)
		602	Elements of Stochastic Processes	50	
		Practical		50	
Practical (B.Ed.)				100	4
1. Micro Teaching- at least 8 skills. सूक्ष्म शिक्षण- कम से कम 8 कौशल।				25	
2. Action Research Project- Based on School/Class/Community Problem. क्रियात्मक अनुसंधान योजना- विद्यालय/कक्षा/सामुदायिक समस्याओं पर				20	

आधारित।		
3. Use of ICT and development of power point presentation (PPT) including improvisation of teaching aids. सूचना एवं सम्प्रेषण तकनालजी का अनुप्रयोग तथा पावर प्वाइंट प्रस्तुतियों का विकास जिसमें शिक्षण उपकरणों का निर्माण भी शामिल है।	20	
4. Personality development with emphasis on- Communication skill including language use and improvement of speech. व्यक्तित्व विकास— सम्प्रेषण कौशल (भाषा प्रयोग एवं वाक् सुधार सहित) पर बल देते हुए।	15	
5. Internship - I (4 weeks) School visit: primary/upper primary/ secondary and preparation of status report about various facilities provided in the school. विद्यालय भ्रमण : प्राथमिक/उच्च प्राथमिक/माध्यमिक विद्यालय एवं विद्यालयों में उपलब्ध विभिन्न संसाधनों की एक रिपोर्ट तैयार करना।	20	

SEMESTER-VII

701 Pedagogy of School Subject-1 Marks-100 Credits-4

PCM Group and BZC Group (Both) Science Teaching

702 Pedagogy of School Subject-2 Marks-100 Credits-4

PCM Group Mathematics Teaching

BZC Group Biology Teaching

Practical (B.Ed.)-

Internship -II (16 weeks) (School Attachment) 200 Marks (8 Credits)

1. Participation in school chores such as prayers, assembly, organization of co-curriculum activities etc. 10 Marks

विद्यालयी क्रियाकलापों यथा प्रार्थना, दैनिक सभा एवं पाठ्यक्रम सहगामी क्रियाओं के आयोजन में प्रतिभाग।

2. Practice teaching-30 lesson each subject total 60 lesson, supervised by B.Ed. faculty. 80+80= 160 Marks

शिक्षण अभ्यास— बी०एड० पर्यवेक्षकों के निर्देशन में प्रत्येक विषय से 30 पाठ कुल 60 पाठ।

3. Community work सामुदायिक कार्य 10 Marks

4. Scouting and Guiding -Under the guidance of an authorized trainer with certificate. 10 Marks

स्काउटिंग एवं गाइडिंग— प्राधिकृत प्रशिक्षक के निर्देशन में प्रमाण पत्र सहित

5. Yoga Education – Under the guidance of a formally trained yoga expert with certification from the concerned institution. 10 Marks

योग शिक्षा— औपचारिक रूप में प्रशिक्षित योग विशेषज्ञ के निर्देशन में प्रमाण पत्र सहित।



SEMESTER-VIII

S.N.	Name of Subject	Paper Code	Course Title	Marks	Credits
1	Physics	801	Atomic Physics and Lasers	50	4
		802	Statistical Mechanics	50	
2	Chemistry	801	Analytical Chemistry-II and Inorganic Chemistry -IV	50	4
		802	Organic Chemistry-IV and Physical Chemistry-IV	50	
3	Mathematics	801	Number Theory	50	4
		802	Probability	50	
4	Zoology	801	Functional Anatomy and Economic Importance of Chordates	50	4
		802	Immunology, Microbiology, Environmental Biology & Biotechniques	50	
5	Botany	801	Cytogenetics and Evolution Process	50	4
		802	Microbiology and Plant Pathology	50	
6	Statistics	801	Demand analysis, Analysis of Income Distribution and Queuing theory	50	4
		802	Reliability	50	
	Pedagogy Related (B.Ed.)	801	Any two of the following	100	4
		802	elective papers (specialization) A. Human Rights, Non Violence and Peace Education मानवाधिकार, अहिंसा एवं शांति शिक्षा B. Special Education विशिष्ट शिक्षा C. Elementary Education प्राथमिक शिक्षा D. Educational and Vocational Guidance शैक्षिक एवं व्यावसायिक निर्देशन E. Value Education मूल्य शिक्षा	100	4

SEMESTER-I

हिन्दी

101— प्राचीन काव्य

Credits- 4

इस प्रश्नपत्र में अंकों का विभाजन इस प्रकार रहेगा—

3 व्याख्या — 3 x 10 = 30 अंक, 2 निबन्धात्मक प्रश्न — 2 x 20 = 40 अंक

5 लघु उत्तरीय प्रश्न — 5 x 6 = 30 अंक

पूर्णांक —100

पाठ्य—विषय :

मध्ययुगीन काव्य : डॉ० सत्यनारायण सिंह

प्रकाशक—विश्वविद्यालय प्रकाशन, वाराणसी।

1— संकलित कवि — कबीर, रैदास, मलिक मुहम्मद जायसी, सूरदास, गोस्वामी तुलसीदास, बिहारीलाल, घनानन्द, भूषण।

(क) रस अलंकार और छन्द : रस, अलंकार और छन्द पर निम्नलिखित प्रश्न पूछे जायेंगे—

1. रस और उसके अवयवों का सामान्य परिचय, रसों का वर्गीकरण—लक्षण एवं उदाहरण

2. (अ) शब्दालंकार—अनुप्रास (छेका, वृत्ति, लाटा), श्लेष, वक्रोक्ति।

(ब) अर्थालंकार—उपमा, प्रतिवस्तूपमा, अनन्वय, प्रतीप, रूपक, उल्लेख, स्मरण, भ्रांतिमान, संदेह, अपह्नुति, उत्प्रेक्षा, अतिशयोक्ति दृष्टांत, व्यतिरेक, समासोक्ति, व्याजस्तुति, विरोधाभास, विभावना असंगति, मीलित।

3. छन्द (अ) मालविकान्जलि, चौपाई, रोला, गीतिका, हरिगीतिका, वीर (अर्द्धसम), बरवै, दोहा, सोरठा।

(ब) वर्णवृत्त—इन्द्रवज्रा, उपेन्द्रवज्रा, वंशस्थ, भुजंगप्रयात, बसन्ततिलका, मालिनी, शिखरिणी, मदाक्रांता, शार्दूलविक्रीडित, सवैया, कवित्त।

(ख) महाकाव्य, खण्ड काव्य, मुक्तककाव्य। रस, अलंकार, छन्द से दो तथा कवियों से तीन लघु उत्तरीय प्रश्न विकल्प सहित पूछे जायेंगे। लघु उत्तरीय प्रश्नों के उत्तर तीन सौ शब्दों से अधिक न हो।

अनुमोदित ग्रंथ :

➤ त्रिवेणी

— रामचन्द्र शुक्ल

➤ कबीर

— हजारी प्रसाद द्विवेदी

➤ बिहारी वाग्भूति

— विश्वनाथ प्रसार मिश्र

➤ बिहारी का नया मूल्यांकन

— बच्चन सिंह

➤ काव्यांग कौमुदी

— आचार्य विश्वनाथ प्रसाद मिश्र

English Literature

101- Poetry

Marks- 100 Credits- 4

Unit-I

Ten short answer questions based on the entire course including three passages for explanation.

Unit-II

Forms of Poetry

1. The Sonnet
2. The Elegy
3. The Ode
4. The Epic
5. The Ballad
6. The Lyric
7. The Dramatic Monologue
8. Allegory

Stanza Forms

1. The Heroic Couplet
2. The Blank Verse
3. The Spenserian Stanza
4. Terza Rhyme

Unit-III

William Shakespeare:	'True Love'
John Donne:	'Twickenham Garden'
Michael Drayton:	'Since There's No Help Left....'

Unit-IV

Alexander Pope	'From Essay on Man' (Lines 1 – 18)
Thomas Gray	'Hymn to Adversity'
William Blake	'A Poison Tree'

Unit-V

William Wordsworth:	'The World is Too Much with Us'
Robert Bridges	'Nightingales'
W.B. Yeats	'Lake Isle of Innisfree'

Q.N0.1-Ten short answer questions based on the entire course including three passages for explanation. 30 marks

Q.N0.2- Long answer questions on any two of the prescribed poets. 20+20= 40 marks

Q.N0.3- Five short questions to be asked on the forms of poetry. 10 marks

Q.N0.4- Two questions to be asked on the text. 20 marks

संस्कृत
101- नाटक, छन्द एवं अलंकार

पूर्णांक- 100 Credits- 4

इकाई (i) - अभिज्ञानशाकुन्तलम् अंक 1-3 तक	25
इकाई (ii)- अभिज्ञानशाकुन्तलम् अंक 4-7 तक	25
इकाई (iii) - नाट्यशास्त्रीय पारिभाषिक शब्द	10

(साहित्यदर्पण षष्ठ परिच्छेद के अनुसार)

सूत्रधार, नान्दी, प्रवेशक, विष्कम्भक, आकाशभाषित, जनान्तिक, अपवारित,
चूलिका, विदूषक और भरतवाक्य।

इकाई (iv) - छन्द	20
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अनुष्टुप्, इन्द्रवज्रा, उपेन्द्रवज्रा, उपजाति, भुजङ्गप्रयात, तोटक, वंशस्थ,
वसन्ततिलका, मालिनी, मन्दाक्रान्ता, शिखरिणी, शार्दूलविक्रीडित, स्त्रग्धरा,
हरिणी, प्रहर्षिणी और आर्या।

इकाई (v)- अलंकार	20
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अनुप्रास, यमक, श्लेष, उपमा, रूपक, उत्प्रेक्षा, अतिशयोक्ति, स्वभावोक्ति,
अर्थान्तरन्यास, दीपक, तुल्यायोगिता, विभावना, विशेषोक्ति, प्रतिवस्तूपमा,
अनन्वय, अप्रस्तुतप्रशंसा, समासोक्ति और सन्देह।

संस्तुत ग्रन्थ

- अभिज्ञानशाकुन्तलम् - कालिदासः - डॉ० शिव बालक द्विवेदी
- अभिज्ञानशाकुन्तलम् - कालिदासः - डॉ० निरूपण वेदालंकार
- अभिज्ञानशाकुन्तलम् - कालिदासः - डॉ० कपिलदेव द्विवेदी
- अभिज्ञानशाकुन्तलम् - कालिदासः - डॉ० राजदेव मिश्र
- अभिज्ञानशाकुन्तलम् - कालिदासः - डॉ० सुधाकर मालवीय
- अभिज्ञानशाकुन्तलम् - कालिदासः - डॉ० गंगासागर राय
- छन्दोऽलंकारमंजरी - कालिदासः - डॉ० बाँकेलाल मिश्र
- छान्दोऽलंकारसौरभम् - कालिदासः - अभिराज डॉ० राजेन्द्र मिश्र



Psychology
101- Basic Psychological Processes

Marks- 75 Credits- 3

Unit- I

Brief historical background, Approaches to the study of behaviour, Nature and scope of psychology. S-O-R model. Methods of psychology: observation, experimental, field study, interview and questionnaire. Physiological bases of behaviour: Neuron, structure and function of brain and spinal cord, autonomic nervous system, glands.

Unit- II

Sensory and perceptual processes- Structure and function of eye and ear. Perception- Meaning, Figure and ground, Laws of perceptual organization, illusion, movement perception. Attention - types and determinants.

Unit- III

Learning- Nature, Theories of learning: Trial and error, Insight, classical and instrumental conditioning. Memory: Nature and types, measures of retention. Forgetting: Meaning and causes, Theories of forgetting- disuse, perseveration consolidation and interference theory.

Unit- IV

Emotion: Nature of emotion, physiological changes during emotions, Theories of emotion: James-Lange and Cannon-Bard theory. Motivation: Innate and acquired motives, achievement, power, affiliation and approval motive.

Books Recommended:

- Atkinson and Hilgard (2002). Introduction to Psychology. New York: Thomson Wadsworth.
- Baron, R. A. (1995). Psychology: The Essential Science. New York: Allyn and Bacon.
- Feldman, R. S. (2006). Understanding Psychology. India: Tata McGraw Hill.
- Lefton, L. A. (1985). Psychology. Boston: Allyn and Bacon.
- Morgan, C. T., King, R.A. Weiz, J. R., Schopler, J. (2001). Introduction to Psychology. Tata McGraw Hill.
- सिंह, अरुण कुमार (2008) : आधुनिक सामान्य मनोविज्ञान, मोतीलाल बनारसी दास, वाराणसी।
- अजीमुर्रहमान (1998) : सामान्य मनोविज्ञान, मोतीलाल बनारसी दास, वाराणसी।
- सिंह, आर.एन. (2005) : आधुनिक सामान्य मनोविज्ञान, अग्रवाल प्रकाशन, आगरा

Sociology
101- Introduction to Sociology

Marks- 100 Credits- 4

Objectives:

This introductory paper is intended to acquaint the students with sociology as a social science and the distinctiveness of its approach among the social science. It is to be organized in such a way that even students without any previous exposure to sociology could acquire an interest in the subject and follow it.

Course Outline:

Unit-I- The Nature of Sociology

The meaning of Sociology: Origin, Definition, Scope, Subject matter, Nature and relation of sociology with other social Sciences. Humanistic orientation to Sociological study.

Unit-II- Basic concepts

Society, community, Institution, Association, Group, Social structure, status and role, Human and Animal Society. Institutions. Family and kinship, religion, education, State.

Unit-III- The Individual and Society

Culture, Socialization, Relation between individual and society.

Unit-IV

The use of Sociology.

Introduction to applied sociology-Sociology and social problems, Ecology and Environment: Pollution, Global warming and Green house effect. Impact of Industrialization and Urbanization on Environment.

Essential Readings:

- Bottommore. T.B. 1972, Sociology: A guide to problems and literature. Bombay: George Allen and Unwin (India)
- Harlambos, M.1998. Sociology: Themes and perspectives. New Delhi Oxford University Press.
- Inkeles, Alex, 1987. What is Sociology ? New Delhi: Prentice-Hall of India.
- Jaigam, No. 1988. What is Sociology .Madras: Macmillan, India
- Johnson, Harry M. 1995. Sociology: A Systematic Introduction. New Delhi, Allied Publishers.
- Schaefer, Richard T. and Robert P. Lamm. 1999 Sociology. Tata-McGraw Hill, New Delhi.

Philosophy

101- Indian Philosophy

Marks- 100 Credits- 4

Unit- I

Chief Characteristics of Indian Philosophy, Charvaka Philosophy- Epistemology, Metaphysics and Ethics.

Unit- II

Jaina and Bauddha Philosophy-Jaina: Substance (Dravya) and it's kinds, Syadvada, Anekantavada, Bondage and Liberation, Bauddha: Four Noble Truth, Pratityasamutpad, Nirvana, Kshanikavad (Momentariness), Anatmavada.

Unit -III

Nyaya-Vaishesika-Epistemology-Pratyaksha; Anuman and their Kinds, Padartha and its Kinds.

Samkhya:Yoga- Purusha & Prakriti:nature and proofs for their existence, Evolution Theory, Satkaryavada,Yoga-Darshan Ashtangyoga and God,

Unit-IV

Mimansa and Vedant- Mimansa- Nature of 'Dharma' Pramanyavad. AdvaitaVedant- Brahman, Maya, Jiva, Bondage and Liberation Vishistadvaita- Refutation of Shankara's Conception of Maya. The Relation between Brahman and Jiva, Brahman, World (Jagat) and Jiva.

Suggested Reading

- M.Hiriyanna : Outlines of Indian Philosophy (Hindi and English Version).
- C.D. Sharma : A Critical Survey of Indian Philosophy (Hindi and English Version).
- Datta & Chatterji : Indian Philosophy (Hindi and English Version)
- S. Radhakrishnan : Indian Philosophy Vol. I & II (Hindi and English Version).
- हरेन्द्र प्रसाद सिन्हा : भारतीय दर्शन की रूपरेखा
- संगम लाल पाण्डेय : भारतीय दर्शन का सर्वेक्षण
- बी०एन०सिंह : भारतीय दर्शन की रूपरेखा
- बलदेव प्रसाद उपाध्याय : भारतीय दर्शन
- हृदय नारायण मिश्र : भारतीय दर्शन



History
101- History of India (1206-1739)

Marks- 100 Credits- 4

Unit-I

Foundation and Consolidation of the Delhi Sultanate-Aibak, Iltutmish, Razia and Balban.

Expansion :-

- a. Khiljis-Conquests, Administrative and Economic Reforms, Deccan Policy
- b. Tughlaqs-Mohammad-Bin-Tughlaq and Feroz Shah Tughlaq.

Unit-II

Timur's invasion.

Causes and Upshots First Battle of Panipat.

Humayun-His difficulties, Battle with Sher Shah and the Causes of his failure. Sher Shah-Administration and Reforms.

Akbar-Conquests, Rajput Policy, Religious Policy and Din-i-Ilahi, Akbar as National Monarch.

Unit-III

Jahangir-His administration and Nurjahan's Supremacy on his administration. Shah

Jahan-His reign represents the Golden age of Mughal History, Deccan Policy

Aurangzeb-North-Western Frontier Policy, Rajput Policy, Shivaji and Mughal

Relation, Religious Policy, Relation with Sikhs and Marathas, Deccan Policy.

Unit-IV

Central Structure of the Mughal Empire.

Administration of the Provinces.

Mansabdari and Land Revenue system.

Invasion of Nadir Shah.

Causes of the Downfall of the Mughal Empire.

Books Recommended

- Medieval India-Dr. Ishwari Prasad
- Mughal Rule in India-Edward Thomson & Garraat
- मुगल साम्राज्य का उत्थान एवं पतन- डॉ० राम प्रसाद त्रिपाठी
- दिल्ली सल्तनत- राधेश्याम



Political Science
101- Political Theory

Marks- 100 Credits- 4

Unit – I

Definition, Nature and Scope of Political Science, Relation with other Social Science, Methods of Study, Approaches to the study of Political Science: The Behavioral Approach.

Unit – II

The State— Its Nature, Origin and Ends. Theories of State Action: Liberalism, Individualism, Idealism, Marxism; Welfare State; Concepts of Sovereignty, Law, Justice, Liberty and Equality.

Unit – III

Democracy and Dictatorship; Parliamentary, Presidential and Plural Types; Unitary and Federal forms of Government. Organs of Government: Executive, Legislature, Judiciary.

Unit – IV

Public Opinion, Political Parties, Pressure Groups, Electoral Systems.

Recommended Books

- E. D. Asirwatham : Political Theory
- A.C. Kapur : Principles of Political Science
- R.C. Agarwal : Political Science
- ज्ञान सिंह सन्धू : राजनीतिक सिद्धान्त
- पन्त, गुप्त, जैन : राजनीतिक शास्त्र के आधार



Economics
101- Principles of Economic Analysis

Marks- 100 Credits- 4

Unit-I

Scope and Method: Definition, Scope and Subject matter of Economics, Nature of Economic Laws, Equilibrium.

Theory of Consumer Behavior: Utility analysis-cardinal and ordinal approaches. Elements of revealed preference, consumer surplus. Indifference curve analysis: properties, consumer equilibrium, income, price and substitution effects.

Demand Analysis: Demand function and law of demand, price, cross and income elasticity of demand.

Unit-II

Production: Production function, combination of factors, laws of production: returns to scales, Law of variable proportions.

Nature of Costs: Short-run and long-run cost curves, Revenue analysis.

Unit-III

Market and Price Determination: Structure of Markets, optimum and representative firm, equilibrium of firm and industry under perfect competition. Price and output under monopoly and price discrimination, Nature of monopolistic competition.

Unit-IV

Economic System: Capitalism, socialism and mixed economy. Problem of resource allocation.

Theory of Distribution and Factor Prices: Concept and measurement, Net economic welfare, distribution of national income, marginal productivity theory of distribution, theories of rent (Ricardian and Modern Theory, Quasi Rent) , wages (Marginal productivity theory and Modern theory), interest (Classical theory, Loanable funds theory, Liquidity preference theory and Modern theory) and profit (Risk, Uncertainty and Modern theory).

Books Recommended:

- Stonier and Hague:- A Text Book of Economic Theory
- R. G. Lipsey ;:- An Introduction to Positive Economics
- Samuelson, Paul A:- Economics
- Gould and Ferguson:- Micro Economic Theory
- डॉ० जे०पी० मिश्र- आर्थिक विश्लेषण के सिद्धान्त
- एम०एल० झिंगन- उच्च आर्थिक सिद्धान्त
- एच०एल० आहूजा- उच्चतर आर्थिक सिद्धान्त

Geography
101- Physical Geography

Marks- 75 Credits- 3

Unit-I

Lithosphere Nature and Scope of Physical Geography : Geological Time Scale, Origin of the Earth, Interior of the Earth Origin of Continents and Oceans, Isostasy, Earthquakes and Volcanoes, Geosynclines, Mountain Building with special reference to folded mountains, Concept of Plate Tectonics.

Unit-II

Rocks-their origin, classification and characteristics, Earth movements- Folding, Faulting and Warping, Weathering and Erosion, Cycle of Erosion by Davis and Penk, Drainage Pattern, Evolution of Land forms by River, Wind, Glacier and Underground water.

Unit-III

Atmosphere ; Composition and Structure of atmosphere : Insolation, Horizontal and Vertical distribution of temperature, Atmospheric pressure and winds, Air masses and Fronts, cyclones and anti-cyclones, Humidity, precipitation and rainfall types, Major climate types- Equatorial, Monsoon, Mediterranean, West European and Hot Desert.

Unit-IV

Hydrosphere: Ocean Floor, composition of marine water-temperature and salinity, Circulation of Ocean Water Waves, Currents and Tides, Ocean deposits, Corals and atolls, oceans as storehouse of resources for the future.

Unit-V

Biosphere Components of Biosphere, Plants and animals evolution, dispersal and distribution: Biotic succession, Biome types and Zoo-geographical regions of the world, Biosphere as a global Eco-System.

Books Recommended

- Strahler, A N and Strahler, A.H. : Modern Physical Geography.
- Barry, R.G and Chorley, R.J. Atmosphere, Weather and Climate Routledge, London.
- Trewartha, G.T. Elements of Physical Geography
- Pears, N.: Basis Biography.



- Sharma, R.C. and Hukku, M : Oceanography for Geographers.
- Singh, Savindra : Physical Geography (Eng./Hindi)
- Lal, D.S. : Climatology (Eng./Hindi)
- Singh, J. and Singh, K.N. Bhautik Bhoogol (Hindi)
- Agarwal, K.M.L.: Bhautik Bhoogol (Hindi)
- Tiwari, A.K. Jalvau Vijyan Ke mool tatva - Rajasthan Hindi Grantha Academy Jaipur 2000.
- Lake, P. (1979) Physical Geography, Cambridge University Press, Cambridge.
- Dayal P. Bhautik Bhoogol.



Pedagogy Related

101- Philosophical Dimensions and Challenges of Education

Marks- 100 Credits- 4

Objectives

The student teacher will be able to:-

1. Understand the development of Indian Education in different periods of time.
2. Appreciate the problems of Indian education.
3. Spell out the importance and role of education in the progress of Indian society.
4. Give meaning to the divergent philosophies behind education.

Contents

Unit-I: Concept of Education

- a) Education: Meaning, Nature and Scope of Education.
- b) Functions of Education in the context of Individual, Social and National level.
- c) Agencies of Education: school, community and family.
- d) Four Pillars of learning in the 21st century context.

Unit- II: Philosophical Dimensions of Education

- (a) Philosophy and Education: Significance of studying philosophy in understanding educational practices and problems. Relationship between philosophy and education.
- (b) Major Philosophical thoughts: Idealism, Naturalism and Pragmatism with their educational implications.
- (c) Educational thinkers and their contribution in developing principles of education- Mahatma Gandhi, Tagore, Aurobindo, Vivekanand and J. Krishnamurti.

Unit-III: Development of Indian Education System

- (a) Vedic system of Education, Buddhist and Medieval system of education.
- (b) Major committees and commissions in Pre-Independence period- Wood's Dispatch, Hunter commission and Sadler commission.
- (c) Major commissions and policies in Post-Independence period- University Education Commission, Secondary Education and National Education

Commission ,NPE-1986 and Revised NPE-1992.

(d) Constitutional commitments for education: Fundamental rights & duties.

Unit-IV: Current Problems in Indian Education

(a) Elementary Education and its major problems: Universalization of Elementary Education, Wastage and Stagnation.

(b) Secondary Education and its major problems: Vocationalization, examination reform and its universalization.

(c) Higher Education and its major problems: Privatization and Autonomy.

(d) Problems of Teacher Education,

(e) Role and Functions of NCTE, NCERT, NIOS, UGC and IGNOU.

Assignment

The pupil-teacher is expected to conduct a study on school- community relationship and submit a report.

Transactional Strategies

Transaction of the course content will be through lectures, discussions, multimedia presentations and interactive sessions.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and 20 marks will be for evaluation which shall be done on the basis of sessional work.

Readings

- Anand, C.L. (1993). The Teacher Education in Emerging Indian Society, NCERT, New Delhi.
- Bokil, V.P. (1970), Foundation of Education, Modern Book Stall, Pune.
- Broudy, Harry. S (1961). Building a Philosophy of Education, Prentice Hall of India, New Delhi.
- Ghanta, R. and Dash, B.N. (2005), Foundations of Education, Neel Kamal Publications, Hyderabad.
- Humayun, K. (1957), Indian Philosophy of Education, George G. Harper &



- Co., New Delhi.
- Mishra, B.K. and Mohanty, R.K. (2003), Trends and Issues in Indian Education, Surya Publication, Meerut.
 - Nayak B.K. (1997), Education in Emerging Indian Society, Taratarini Publications, Berhampur.
 - Saraswati, T.S. (1999), Culture, Socialization and Human Development, Sage Publication, New Delhi.
 - Taneja, V.R. (1998), Education Thoughts and Practice, Delhi University Publications, New Delhi.
 - Young Pai and Joseph (1964), Philosophical Problems of Education, J.P. Hippin Co., New York.
 - Pandey, K.P. (2010), Perspectives in Social Foundations of Education, Sipra Publication, New Delhi.
 - Learning the Treasure Within, Jacques Delors Report, 1996.



SEMESTER-II

हिन्दी 201- आधुनिक गद्य साहित्य

Credits- 4

इस प्रश्नपत्र में अंकों का विभाजन इस प्रकार रहेगा-

3 व्याख्या - 3 x 10 = 30 अंक, 2 निबन्धात्मक प्रश्न - 2 x 20 = 40 अंक

5 लघु उत्तरीय प्रश्न - 5 x 6 = 30 अंक

पूर्णांक : 100

पाठ्यग्रंथ :

1. निबन्ध नवनीत (परिवर्द्धित नवीन संस्करण) : डॉ० सर्वजीत राय एवं डॉ० श्रद्धानंद, अमृत प्रकाशन, ईश्वरगंगी, वाराणसी।

संकलित निबन्धकार : प्रताप नारायण मिश्र, महावीर प्रसाद द्विवेदी, पूर्ण सिंह, रामचन्द्र शुक्ल, हजारी प्रसाद द्विवेदी, हरिशंकर परसाई, विद्यानिवास मिश्र, कुबेरनाथ राय, विवेकी राय।

2. निर्मला (उपन्यास) : प्रेमचन्द

3. अलग-अलग वैतरणी (उपन्यास) : डॉ० शिवप्रसाद सिंह

4. ध्रुवस्वामिनी (नाटक) : जयशंकर 'प्रसाद',

5. गद्य रूप (सामान्य सैद्धान्तिक परिचय) : निबन्ध, नाटक, उपन्यास, कहानी।

(विविध गद्य रूपों से दो तथा पाठ्यक्रम से तीन लघु उत्तरीय प्रश्न विकल्प सहित पूछे जायेंगे। लघु उत्तरीय प्रश्नों के उत्तर तीन सौ शब्दों से अधिक न हो।)

अनुमोदित ग्रंथ :

- | | |
|----------------------------------|----------------------------|
| ➤ हिन्दी उपन्यास | - डॉ० शिवनारायण लाल |
| ➤ हिन्दी गद्य शैली का विकास | - डॉ० जगन्नाथ प्रसाद शर्मा |
| ➤ हिन्दी उपन्यास और यथार्थवाद | - डॉ० त्रिभुवन सिंह |
| ➤ हिन्दी उपन्यास शिल्प और प्रयोग | - डॉ० त्रिभुवन सिंह |
| ➤ आधुनिक साहित्य निबन्ध | - डॉ० त्रिभुवन सिंह |
| ➤ हिन्दी नाटक : उद्भव एवं विकास | - दशरथ ओझा |
| ➤ हिन्दी नाटक | - डॉ० बच्चन सिंह |
| ➤ प्रेमचन्द | - रामविलास शर्मा |
| ➤ काव्य के रूप | - गुलाब राय |

English Literature
201- Prose

Marks- 100 Credits- 4

Unit-I

Ten short answer questions based on the entire course including three passages for explanation

Unit-II

Theory of Prose

Types of Prose

Types of Prose Style

Autobiography/Biography and Memoir

Travelogue

Periodical Essay

Formal Essay

Familiar Essay

Poetic Prose (Euphuism)

Prose of Thought

Unit-III

Bacon

‘Of Studies’

Richard Steele

‘The Spectator Club’

Joseph Addison

‘Sir Roger at Church’

Charles Lamb

‘Dream Children: A Reverie’

Unit-IV

Oliver Goldsmith

‘On National Prejudices’

G.K.Chesterton

‘On the Pleasures of No Longer Being very Young’

R.L.Stevenson

‘Walking Tours’

A.G.Gardiner

‘On Superstitions’

Unit-V

Robert Lynd

‘On Holidays’

J.B.Priestley

‘First Snow’

HilaireBellock

‘In Praise of Ignorance’

E.V.Lucas

‘A Funeral’

Q.N.1- Ten short answer questions based on the entire course including three passages for explanation 30 marks

Q.N.2 & 3- Long Answer Questions on any two of the prescribed essayists.

20+20=40 marks

Q.N.4- Five short questions to be asked on the forms of essays. 10 marks

Q.N.5- Two questions of 150 words each to critically analyze and appreciate any two of the essays. 20 marks



संस्कृत
201- काव्य एवं व्याकरण

पूर्णांक- 100 Credits- 4

इकाई (i) - कुमारसम्भवम् प्रथम सर्ग	30
इकाई (ii)- नीतिशतकम् श्लोक 1 से 50 तक	20
इकाई (iii)- लघुसिद्धान्तकौमुदी (संज्ञा एवं अच्-सन्धि-प्रकरण)	20
इकाई (iv) - लघुसिद्धान्तकौमुदी (हल्-सन्धि और विसर्ग-सन्धि-प्रकरण)	20
इकाई (v)- हिन्दी वाक्यों का संस्कृत में अनुवाद	10

संस्तुत ग्रन्थ

➤ नीतिशतकम्	- डॉ० राजेश्वर मिश्र
➤ कुमारसम्भवम्	- डॉ० शेषराज शर्मा रेग्मी
➤ लघुसिद्धान्तकौमुदी	- डॉ० दीनानाथ तिवारी
➤ लघुसिद्धान्तकौमुदी	- डॉ० सुरेन्द्र देव स्नातक



Psychology
201- Human Development

Marks- 75 Credits- 3

Unit-I: Human development : Nature and Scope. Principles of development, Laws of development, Stages of development, Methods of studying development-longitudinal and cross-sectional, Dynamics of human development- Role of maturation and learning, Heredity and environment, Imitation and identification.

Unit-II: Physical development – Meaning, stages, prenatal and postnatal determinants. Development of nervous system and motor abilities, Sensory and perceptual development, Sensory capacities of infant, Perceptual development- dimensions and determinants.

Unit-III: Development of cognition and understanding: Meaning and theory of cognitive development, Development of understanding: factors, concept development and language development. Social development : Criteria and stages, Concept and development of emotions, Watson and Bridge's theories. Development of morality- Kohlberg's theory and determinants.

Unit-IV: Adolescence: Meaning, characteristics, changes and problems. Exceptional children: Meaning and types- Mentally retarded child, Gifted child, Delinquent child, Backward child. Aging- meaning, characteristics, personal, social, vocational and family adjustment, Factors influencing adjustment during aging.

Books Recommended

- Berk, L.E. (2003) : Child Development, 6th Ed., Prentice-Hall, India.
- Hurlock, E.B. (2001) ; Child Development, 6th Ed. Tata McGraw-Hill.
- Libert (1980) : Development Psychology, Sage.
- Winder Zanden : Human Development, Alferd Knof, N.Y.
- लाल, जे.एन. (2000) : आधुनिक विकासात्मक मनोविज्ञान, अग्रवाल प्रकाशन, आगरा।
- सिंह, आर.एन. (2002) : आधुनिक विकासात्मक मनोविज्ञान, अग्रवाल प्रकाशन, आगरा।
- सिंह, राजेन्द्र प्रसाद; उपाध्याय, जितेन्द्र एवं सिंह, राजेन्द्र (2009) : विकासात्मक मनोविज्ञान, मोतीलाल बनारसीदास, वाराणसी।

Psychology
201- Practical

Marks- 50 Credits- 2

(Any 8 of the following 10 practicals)

1. Span of attention (ध्यान विस्तार)
2. Negative after image (निषेधात्मक अनुसंवेदना)
3. Learning curve/Maze learning (अधिगम वक्र/भूल-भूलैया अधिगम)
4. Bilateral transfer (द्विपार्श्विक स्थानान्तरण)
5. Verbal intelligence test (शाब्दिक बुद्धि परीक्षण)
6. Simple Reaction Time (सामान्य प्रतिक्रिया काल)
7. Introvert -Extroversion Test (अन्तर्मुखता-बहिर्मुखता परीक्षण)
8. Measurement of self-esteem in children (बच्चों के आत्म-बोध का मापन)
9. Social/Emotion Maturity test (सामाजिक/संवेगात्मक परिपक्वता परीक्षण)
10. Measurement of moral values (नैतिक मूल्यों का मापन)



Sociology

201- Society in India: Structure and Change

Marks- 100 Credits- 4

Objectives

It is presumed that student has some familiarity with Indian society by virtue of the fact that he is a member of it and that he has observed and experienced some facts of it. However this familiarity is likely to be superficial selective and rather fragmentary. The course is aimed at rectifying these limitations by presenting a comprehensive, integrated and empirically –based profile of Indian society.

The continuity between the present and the past is an evident feature of Indian society. Though this continuity is reflected in the structure of the course. The focus is on the contemporary Indian society. It is hoped that the sociological perspective on Indian society presented in this course

will also enable students to gain a better understanding of their own situation and region.

Course outline:

Unit-I: The structure and composition of Indian Society: Villages, Towns, Cities, Rural, Urban linkages, problem of tribes, weaker section, dalits and O.B.C.'s, efforts for their upliftment, women and minorities population profile and related issues.

Unit-II: Cultural and ethnic diversity, diversities in respect of language, caste, regional and religious beliefs and practices and cultural pattern .

Unit-III: Basic Institutions of Indian society: Caste, marriage, religion, class, joint family and democracy. Jagmani System.

Unit-IV: Culture: Material and Non material culture, cultural lag. Changes and transformation in Indian society ,factors affecting National integration: Regionalism Communalism and Naxalism.

Essential readings

- Bose, N.K. 1967, Culture and Society in India, Bombay : Asia Publishing House.
- Bose, N.K. 1975, Structure of Hindu Society. New Delhi.
- Dube, S.C. 1990, Society in India.(New Delhi: National Book Trust.)



- Dube, S.C. 1995, Indian Village (London : Routledge)
- Dube, S.C. 1958: India's changing Villages (London: Routledge and Kegan Paul).
- Karve, Irawati, 1961 : Hindu Society : An Interpretation(Poona : Deccan- College)
- Lannoy, Richard, 1971: The Speaking Tree : A study of Indian Society and Culture (Delhi: Oxford University Press).
- Mandelbaum, D.G. 1970 : Society in India (Bombay: Popular Prakashan)
- Srinivas, M.N. 1980 : India: Social Structure (New Delhi: Hindustan Publishing Corporation)
- Srinivas, M.N. 1963: Social Change in Modern India (California, Berkeley: University of California Press).
- Singh, Yogendra,1973 : Modernization of Indian Tradition (Delhi: Thomson Press).
- Uberoi, Patricia, 1993: Family, Kinship and Marriage in India, Oxford University Press, New Delhi.




Philosophy
201- Modern Western Philosophy

Marks- 100 Credits- 4

Unit-I: Chief Characteristics of Modern Western Philosophy Descartes- Cartesian method, Cogito Ergo Sum, Proofs for the Existence of God, Nature of Substance, Mind Body Relation – Interactionism, Nature of Knowledge.

Unit-II: Spinoza & Leibnitz: –Spinoza Substance, Pantheism, Attributes and Modes, Mind- Body Problem- Parallelism, Leibnitz Substance, Nature of Monads, Pre-established Harmony and Mind Body Problem.

Unit-III: Locke & Berkeley- Locke-Epistemology- Refutation of Innate Ideas, Nature of Knowledge, Primary and Secondary Quality, Simple and Compound Ideas, Limit of Knowledge, Matter (substance)

Berkeley- Refutation of Abstract Ideas, Subjective Idealism.

Unit-IV: Hume- Impressions and Ideas, Association of Ideas. Refutation of self, God, causality, skepticism.

Kant- Criticism, Nature of Knowledge, Synthetic- Apriori Judgements.

Suggested Reading

- Fuller B.A.G. : A History of Philosophy
- W.T. Stace : A Critical History of Philosophy
- Falkenberg : A History of Modern Philosophy
- Thilly : A History of Philosophy
- W.K. Wright : A History of Modern Philosophy
- चन्द्रधर शर्मा : पाश्चात्य दर्शन
- याकूब मसीह : पाश्चात्य दर्शन का समीक्षात्मक इतिहास
- संगम लाल पाण्डेय : आधुनिक दर्शन की भूमिका
- जे०एस०श्रीवास्तव : आधुनिक पाश्चात्य दर्शन का इतिहास
- हरिशंकर उपाध्याय : पाश्चात्य दर्शन का उद्भव एवं विकास
- दयाकृष्ण : पाश्चात्य दर्शन Vol. I & II
- हृदयनारायण मिश्र : पाश्चात्य दर्शन :



History
201- The Rise of Modern Western Thought (1453-1789)

Marks- 100 Credits- 4

Unit-I

Renaissance-Causes and Features.

Reformation-Causes and Upshots, Martin Luther, Calvin.

Counter Reformation-Jesuit Society and other agencies.

Rise and decline of Spain.

Charles V, Philip II.

Unit-II

Thirty Year's War-Causes, Expansion and Consequences.

France-Henry IV, Richelieu, Mazarine and Louis XIV.

The age of Enlightened Despotism.

Frederick the Great.

Russia-Peter the Great and Catherine II.

Unit-III

England-Struggle between the Parliament and the first two Stuart Rulers, Growth of Cabinet system and Industrial Revolution.

Austria-Maria Theresa and Joseph II.

Unit-IV

The war of Austrian Succession.

The Seven year's war.

Division of Poland.

France on the eve of French Revolution.

Books Recommended

- History of Europe-H.A.L. Fisher.
- आधुनिक यूरोप का इतिहास-हीरालाल सिंह और रामवृक्ष सिंह
- आधुनिक यूरोप का इतिहास खण्ड-एक-लाल बहादुर वर्मा
- आधुनिक यूरोप का इतिहास-विमल इन्द्रपाल
- आधुनिक यूरोप का इतिहास-डॉ० ईश्वरी प्रसाद



Political Science
201- National Movement & Constitution of India

Marks- 100 Credits- 4

Unit – I

The Birth and Growth of Nationalism of India, The Indian National Congress, The Moderates and the Extremists; Landmarks of India National Movement; Non-Cooperation, Civil Disobedience and Quit India Movement; The Independence Act-1947

Unit – II

The Making of the Indian Constitution; Salient Features of the Constitution; Fundamental Rights and Duties, Directive Principle of State Policy; Indian Federal System; Centre-State Relations

Unit – III

The Union Government. The President; The Prime Minister; The Council of Minister, The Parliament; The Supreme Court

Unit – IV

State Government; The Legislature; The Executive; The High Court; Panchayati Raj System in India.

Recommended Books

- Ruchi Tyagi: Indian Government and Politics
- J.C. Johari: Indian Government and Politics (हिन्दी में भी उपलब्ध)
- एस0एम0 सर्ईद: भारतीय राजनीतिक प्रणाली
- गांधी जी राय: भारतीय शासन एवं राजनीति



Economics
201- Indian Economic Problems

Marks- 100 Credits- 4

Unit – I

Nature and Structure of Indian Economy: Growth and composition. Sectoral development of the Indian Economy and their interrelationship. Utilization of resource human and natural. Problems of population and population policy of India. Need, Objectives and strategy of planning in India. Poverty, unemployment, its nature and extent, Employment policy.

Unit – II

Agriculture: Trends in production and productivity, reforms, tenurial system, distribution of land, ceilings consolidation of holdings. Agriculture labour and problem wages, employment and under-employment. Agriculture finance, Problems of irrigation and supply of inputs. Market cooperative farming, rural development programmes Technology.

Change in Agriculture strategy: Agricultural production strategy. Price policy in agriculture.

Unit – III

Industry and Service Sector: Growth and Structure of industry. Industrial and licensing policies of major industries, large, small and cottage industries. Industrial finance, foreign capital and multinationals. Industrial labour – wages and wage regulation, social security, housing, industrial peace, Trade Union movement.

Service Sector: Nature, Structure and Development.

Unit – IV

Economy of Uttar Pradesh: Nature, Structure and Development of U.P.'s Economy. U.P. Economy through plans. Demographic Scenario of U. P., Infrastructure: energy, transport and water resources. Decentralization of planning in U.P. industrial development in U.P.: Public Sector Units, Small Scale Industries, Informal Sector, Hurdles and Prospects. Agriculture, Employment, Poverty, Inter-Regional Disparities and Policy Issues.



Books Recommended:

- Alak Ghosh – Indian Economy
- Rudra Dutt & Sundaram – Indian Economy
- Government of India Annual – Economic Survey
- Five Year Plans, Govt. of U. P.
- डॉ. जे. पी. मिश्र – भारतीय अर्थव्यवस्था
- मिश्रा एवं पुरी – भारतीय अर्थव्यवस्था



Geography
201- Human Geography

Marks- 75 Credits- 3

Unit-I: Concept and Nature: Meaning, Scope and Development of Human Geography, Man and Environment relationship-Determinism, Possibilism, Neodeterminism, Probabilism, Basic principles-Principle of Activity or Change, Principle of Terrestrial Unity or whole.

Unit-II: Habitation (Population and Settlement): Growth and Distribution of population and world pattern; global migration - causes and consequences, concept of over population and under population. Human Settlements - Origin, types (Rural-Urban) characteristics, size and distribution. (India & World: major ones to be emphasized), House types and their distribution with special reference to India.

Unit-III: Economy: Evolution of Human Economy; Sequence of human occupance, Primitive Economics-Food gathering, Hunting, Pastoral herding, Fishing, Lumbering and Primitive agriculture. Later major innovations and their impact.

Unit-IV: Society and Culture: Evolution of man (Australopithecus, Homo Erectus, Homo Sapiens. Man's spread over the earth during the Pleistocene) cultural Diffusion, Cultural realms. World Human Races-Classification, Characteristics and Distribution.

Unit-V: Population Tribes: Some typical modes of life of world Tribes-Eskimos, Kirghiz, Bushman, Masai, Semang and Pygmies.

Habitat, Economy and Society of Indian Tribes-Bhotias, Gaddis, Tharus, Bhil, Gond, Santhal, Nagas (with reference to their present-day transformation)

Books Recommended

- Spencer, J.E. and Thomas, W.L. Introducing Cultural Geography.
- Thomas, W.L. (ed.) Man's Role in Changing the Face of the Earth.
- Peripillou, Human Geography
- Smith, D.M. Human Geography-A Welfare Approach, Edwin Arnold, London.
- Forde, C.D., Habitat, Economy and Society
- Dicken, S.N. and Pitts. F.R., Introduction to Human Geography.
- Kaushik, S.D., Manav Bhoogol (Hindi)
- De Blij, H.J., Human Geography, Culture, Society and Space, John Wiley, New York, 1996.



- Chadna, R.C., Population Geography.
- Singh, J, Manav Bhoogol (Hindi)
- Bansal, S.C. Manav Bhoogol (Hindi)
- Srivastava, V.K. and Rao, B.P. Manav Bhoogol
- Singh, L.R.: Human Geography.
- Jordon, T.G. and Lawntre, The Human Mosaic
- Hira Lal, Jansankhya Bhoogol
- Fellman, J.L. Human Geography-Landscapes of Human Activities, Brown and Bench Man, Pub. U.S.A. 1997.
- Michael, Can, New Patterns: Process and change in Human Geography. Nelson, U.K. and Canada, 1996.



Geography
201- Practicals

Marks- 50 Credits- 2

Lab Work

Unit-I: The nature and scope of cartography, Scales- Construction of Comparative, Diagonal and Vernier Scales, Enlargement and Reduction of maps. Calculation of area of maps of different shapes by graphical and arithmetical methods.

Unit-II: Map Projections : General Principles : Classification, properties and choice of map projections - Merits and demerits and Construction of Cylindrical Equal area, Mercator's, Conical with two Standard Parallels, Bonne's, Polyconic, Gnomonic Orthographic and Stereographic Polar Zenithal projections.

Unit-III: Methods of showing relief: Hachure, shading, contours & layer tints; representation of different landforms by contours. Drawing of profiles - cross & long profiles, superimposed, composite & projected profiles. Slopes & gradients.

Unit-IV: Topographical Maps

Introduction: Expansion and Indexing: Coverage, Scale and Topo Symbols. Study and Interpretation of One Inch/1:50,000 Survey of India Toposheets representing Plain, Plateau and Mountain areas under the following heads- Relief, Drainage Characteristics, Land-use, Settlement types and patterns, and means of Transport and communication with special reference to recognition of Land forms based on contours and profiles drawn on them.

Division of Marks

Lab Work-One question from each unit with internal.

Choice (Duration - Three Hours) 40 Marks

Viva-Voce & sessional records 10 Marks

Books Recommended

- Monk house, F.J.: Maps & Diagrams, (1985); Methuen, London.
- Robinson, A.H: Elements of Practical Geography.
- Singh, R.L. Elements of Practical Geography, Kalyani Publishers, New Delhi (English & Hindi).



- Mishra, R.P. and Ramesh, A: Fundamentals of Cartography.
- Singh, L.R. & Singh, R.N. Map work and Practical Geography (Eng./Hindi), Sharda
- Pustak Bhawan, Allahabad.
- Sharma, J.P. Practical Geography (Hindi)
- Lal, Hira : Prayogatmak Bhoogol Ke Adhar (Hindi)
- Tiwari, R.C.and Tripathi, Sudhakar : Abhinav Prayogic Bhoogol, Allahabad



Pedagogy Related
201- Psychological Dimensions of Education

Marks- 100 Credits- 4

Objectives

- a) The student teacher will be able to:-
- b) Understand the meaning and scope of Educational Psychology.
- c) Acquire knowledge and understanding of various stages of human development.
- d) Develop understanding of the process of learning in the context of various theories of learning and motivation.
- e) Understand the concepts of personality, intelligence and creativity.

Contents

Unit I: Educational Psychology and Development of Learner

- (a) Educational Psychology: Meaning, nature, methods, scope and importance of Educational Psychology for teachers.
- (b) Concept and principles of growth and development, stages of human development.

Unit II: Learning and Motivation

- (a) Concept and nature of learning, factors influencing teaching-learning process, Memory and Retention.
- (b) Theories of learning: Trial and error, classical conditioning, operant conditioning, theory of insight, constructivism and social learning.
- (c) Motivation: Nature, types, some selected content and process theories with special referenced to Abraham Maslow, Alderfer, McClelland and Skinner's reinforcement theory, techniques of enhancing learner's motivation.

Unit III: Personality, Intelligence and Creativity

- (a) Personality: Meaning, Nature, Trait, Type and Psychoanalytic theories; Methods of assessing Personality.
- (b) Intelligence: Nature and Theories, Types of Intelligence, IQ, EQ and SQ; Measurement of Intelligence.
- (c) Creativity: Meaning, Nature and Development of creativity among school children.



Unit IV: Psychology of Adjustment

- (a) Behavioristic and Psychoanalytic models.
- (b) Characteristics of a well-adjusted person.
- (c) Stress in the context of Education: Types of stress; Stress management techniques, Role of teachers.

Practical Work

Each student will be required to administer any two psychological tests: Intelligence (verbal and non-verbal), creativity, personality, memory and aptitude.

Assignment

Conduct a case study on any child who has problems either in learning or in his/ her adjustment to the environment.

Transactional Strategies

Transaction of the course will be through lectures, discussion, multimedia presentations and interactive sessions.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be credited on the basis of evaluation in respect of sessional work.

Readings

- Bernard, H.W. (1961), Mental Hygiene of Classroom Teachers, McGraw Hill, New York.
- Bhatia, H.R. (1965), A Text Book of Educational Psychology, Asia Publishing House, Bombay.
- Cronbach, L.J. (1958), Educational Psychology, Harcourt, New York (2nd ed.)
- Dandekar, W.N. (1976), The Psychological Foundations of Education, Macmillan, Delhi.
- Jacob, W. and Philip, W. (1962), Creativity and Intelligence, John Wiley, New York.
- Kuppaswamy, B. (1986), Social Change in India, Vikas Publishing House, New Delhi.
- Pandey, K.P. (2007), Advanced Educational Psychology, Vishwavidyalaya Prakashan, Varanasi.



SEMESTER-III

हिन्दी 301- आधुनिक काव्य

Credits-4

इस प्रश्नपत्र में अंकों का विभाजन इस प्रकार रहेगा-

3 व्याख्या - 3 x 10 = 30 अंक, 2 निबन्धात्मक प्रश्न - 2 x 20 = 40 अंक

5 लघु उत्तरीय प्रश्न - 5 x 6 = 30 अंक

पूर्णांक : 100

पाठ्यग्रंथ :

1. आधुनिक हिन्दी काव्य- सम्पादक : डॉ० शिवकुमार मिश्र, विश्वविद्यालय प्रकाशन, चौक, वाराणसी।
संकलित कवि : मैथिली शरण गुप्त, जय शंकर 'प्रसाद', सूर्यकांत त्रिपाठी 'निराला', सुमित्रानन्दन पंत, महादेवी वर्मा, रामधारी सिंह 'दिनकर', सच्चिदानन्द हीरानन्द, वात्स्यायन 'अज्ञेय', वैद्यनाथ मिश्र, 'नागार्जुन', सुदामा पाण्डेय 'धूमिल'।

अनुमोदित ग्रंथ :

- | | |
|--------------------------|--|
| ➤ कमलाकान्त पाठक | - मैथिलीशरण गुप्त : व्यक्ति और काव्य |
| ➤ रामेश्वर लाल खण्डेलवाल | - जयशंकर प्रसाद : वस्तु और काव्य |
| ➤ डॉ० राम विलास शर्मा | - निराला |
| ➤ डॉ० नगेन्द्र | - सुमित्रानन्दन पंत |
| ➤ डॉ० प्रेमशंकर | - स्वच्छन्दतावादी काव्य |
| ➤ डॉ० नामवर सिंह | - आधुनिक हिन्दी कविता की प्रमुख प्रवृत्तियाँ |
| ➤ डॉ० युगेश्वर | - प्रसाद काव्य का नया मूल्यांकन |
| ➤ डॉ० शम्भूनाथ सिंह | - छायावाद युग |

English Literature
301- Drama

Marks -100 Credits- 4

Unit-I:

Ten short answer questions based on the entire course including three passages for explanation

Unit-II

Theory of Drama

Elements of Drama

Tragedy and various types

Comedy and various types

Tragi-comedy

Expressionist Drama

Drama of Ideas

Poetic Drama

Closet Drama

The Problem Play

Theatre of Absurd

Unit-III

Shakespeare : Macbeth

Unit-IV

Oliver Goldsmith : She Stoops to Conquer

Unit-V

G B Shaw : Candida

Q.No. 1-Ten short answer questions based on the entire course including three passages for explanation 30 Marks

Q.No. 2 &3-Two Long Answer Questions from Plays 20+20=40 Marks

Q.No. 4-Five Short Answer Questions on theory and forms of Drama Marks
2X5=10 Marks

Q.No. 5-Two Analytical Questions of 150 words each on the Plays prescribed
10+10=20Marks



संस्कृत

301- वेद, व्याकरण एवं अनुवाद

पूर्णांक-100 Credits- 4

इकाई (i)	– वैदिक सूक्त	45
	अग्नि सूक्त ऋग्वेद 1-1	
	विष्णु सूक्त " 1-154	
	इन्द्र सूक्त " 2-12	
	पुरुष सूक्त " 10-90	
	शिवसंकल्प सूक्त शुक्ल यजुर्वेद 34 / 1-6	
	पृथिवी सूक्त अथर्ववेद 12 / 1-10	
इकाई (ii)	– ईशावास्योपनिषद्	15
इकाई (iii)	– लघुसिद्धान्तकौमुदी	30
	(विभक्त्यर्थ एवं समास प्रकरण)	
इकाई (iv)	– अपठित संस्कृत पद्य से हिन्दी में अनुवाद	10

संस्तुत ग्रन्थ

- न्यू वैदिक सेलेक्शन प्रथम भाग – बी०बी० चौबे
- वेदचयनम् – डॉ० विश्वरनाथ त्रिपाठी
- वेदचयनम् – डॉ० कृष्णदत्त मिश्र
- ईशावास्योपनिषद् – डॉ० कृष्णदत्त मिश्र
- ईशावास्योपनिषद् – डॉ० विजय शंकर पाण्डेय
- ईशावास्योपनिषद् – डॉ० गायत्री शुक्ल
- लघुसिद्धान्तकौमुदी – डॉ० आद्या प्रसाद मिश्र
- श्रुतिसौरभम् – डॉ० दीपक कुमार
- श्रुतिप्रभा – प्रो० वृजेश कुमार शुक्ल
- ईशावास्योपनिषद् – डॉ० शिवबालक द्विवेदी

Psychology
301- Psychopathology

Marks- 75 Credits- 3

Unit-I: Introduction to psychopathology. Concept of normality and abnormality, View points about abnormality. Classification of mental disorders – DSM IV & ICD-10. Symptoms and syndromes of mental disorders.

Unit-II: Models of psychopathology - psychodynamic, behavioral and cognitive. Adjustment mechanisms : Frustration and Defense mechanisms, Conflict. Methods of psychopathology: Case history, interview and projective techniques.

Unit-III: Generalized Anxiety disorder: Definition, symptoms and causes. Phobic anxiety disorder- nature, symptoms, types and causes. Obsessive-compulsive disorder- symptoms and causes. Panic Disorder. Psychotic disorders- Schizophrenia : nature, symptoms, types and causes, Delusional disorder: nature, symptoms, types and causes, Mood disorders- nature and types.

Unit-IV: Personality disorders: Psychopath personality. Alcohol and drug abuse and dependence. Mental Retardation: Concept, characteristics, types and causes. Dissociative disorders- Nature, types, characteristics and etiology. Conversion disorder: Nature, Symptoms and causes.

Books Recommended:

- Carson, R.C.; Butcher, J. N. & Mineka, S. (2010). Abnormal Psychology and Modernlife. Pearson Education, Inc. and Dorling Kindersley publications Inc.
- Sarason, G. I. and Sarason, R. V. (2007). Abnormal Psychology: The Problem of Maladaptive Behaviours (11th Edition). Pearson Education Inc. and Dorling Kindersley Publishing Inc.
- त्रिपाठी, जयगोपाल एवं त्रिपाठी, विवेक (2007) : असामान्य मनोविज्ञान, हर प्रसाद भार्गव, आगरा।
- सिंह, लाभ एवं तिवारी, गोविन्द (2008) : असामान्य मनोविज्ञान, विनोद पुस्तक भण्डार, आगरा।
- सिंह, अरूण कुमार (2009): आधुनिक असामान्य मनोविज्ञान, मोती लाल बनारसी दास, वाराणसी।
- सिंह, आर,एन, (2010) आधुनिक असामान्य मनोविज्ञान, अग्रवाल प्रकाशन, आगरा।



Sociology
301- Indian Society: Issues and Problems

Marks- 100 Credits- 4

Objectives:

Society in India today is undergoing rapid and massive changes. Many of the Changes are such that they tend to call into question the age-old social norms and practices, thus giving rise to some critical social issues and problems.

This course is designed to indentify and analyze come of such emerging Social issues and problems form sociological perspective. In the interest of systematic ordering, the issues and problems have been classified into four sets: structural, familial development and organizational.

The course seeks to go beyond the commonsense understanding of the prevailing social issues and problems in order to project them into their structural context. Accordingly, it focuses on their structural linkages and interrelationships.

Hence the objectives of the course are to sensitize the students to the emerging social issues and problems of contemporary India, enable them to acquire sociological understanding of these issues and problems over and above their commonsense understanding, empower them to deal with these issues and problems and to serve as change agents both in governmental and non-governmental and organizations.

Course outlines

Unit-I: STRUCTURAL: Poverty, inequality of caste and gender, Problemes of Religious, ethnic and regional, minorities, backward classes and dalits. Human Rights violation.

Unit-II: FAMILIAL: Dowry, domestic violence, divorce, intra and inter- Generational conflict, problemes of elderly.

Unit-III: DEVELOPMENTAL: Development induced displacement, ecological degradation, consumerism, crisis of Values.

Unit-IV: DISORGANIZATIONAL: Crime and Delinquency, White Collar crime and criminals, drug addiction, suicide, terrorism, cyber crime. Corruption in public sphere.

Essential readings:

- Beteille, Andre, 1974, Social Inequality, New Delhi, OUP
- Beteille, Andre, 1992, Backward classes in Contemporary India, New Delhi -OUP.
- Berreman, G.D. 1979, Caste and other inequalities: Essays in inequality- Meerut: Folkore Institute.



- Dube, Leela. 1997. Woman and Kinship. Comparative perspective on Gender in South and Southeast Asia. New Delhi: Sage Publications.
- Gadgil, Madhav and Guha, Ramchandra. 1996. Ecology and Equity: The Use and abuse of nature in Contemporary India. New Delhi. -OUP
- Gill, S.S. 1998. The Pathology of Corruption, New Delhi.:
- Guha, Ranjit, 1991. Subaltern Studies, New York: OUP
- Inden, Ronald. 1990. Imaging India, Oxford: Basil Blackward.
- Lewis Oscar, 1966. "Culture of Poverty" Scientific American, Vol. II and V No. 4pp. 1925.
- Madan, T.N. 1991, Religion in India, New Delhi. OUP
- Ministry of Home Affairs. 1998. Crime in India. New Delhi. Govt. of India.
- Satya Murty. T.V. 1996 Region, Religion, Caste, Gender and Culture in Contemporary India. New Delhi. OUP.
- Sharma, S.L. 1997. "Towards Sustainable Development in India" In S.R. Mehta (Ed), Population, Poverty, and Sustainable development, Jaipur. Rawat Publications.
- Sharma, Ursula. 1983. Woman, Work and Property in North West India. London : Tavistock.

References

- Allen, Douglas (Ed). 1991. Religion and Political Conflict in South Asia, West Port Conn. : Connecticut University Press.
- Bardhaman .P. 1984, Land.: Labour and Rural Poverty. New Delhi. OUP.
- Brekenbridge, C. 1996, Consuming Modernity: Public Culture in Contemporary India, New Delhi. OUP.
- Singh, Anoop Kumar 2011. Ramification of Human Rights in India, New Delhi, Serials Publication.
- Guha, Ramchandra, 1994. Sociology and the Dilemma of Development, New Delhi: OUP
- Juergensmeier, Mark 1993, Religious Nationalism Confronts the Secular State. New Delhi: OUP
- Sharma, .L. 2000 Empowerment without Antagonism: A case for Reformulation of Woman's Empowerment Approach .Sociological Bulletin. Vol.49. No.1.
- Waxman. 1983. The Stigma of Poverty: A Critique of poverty Theories and policies.

Philosophy
301- Ethics

Marks- 100 Credits- 4

Unit-I : Definition and nature of Ethics, Nature and object of moral judgements, Freedom of will and moral responsibility- Determinism and Indeterminism, psychological basis of Ethics.

Unit-II: Teleological Theories – Utilitarianism-Bentham, and Mill, Evolutionism-Spencer

Unit-III: Deontological Theories – Intuitionism – Butler, Rationalism – Kant- Good will, Duty for the duty's sake, categorical imperative, Postulates of morality, Perfectionism.

Unit-IV: Niskam Karma yoga and Sthitprajna of Gita, Nietzsche- Revaluation of values, Superman, Ethics of Gandhi

Suggested Reading

- William Lillie : An Introduction to Ethics
- Mackenzie : A Manual of Ethics
- C.D. Broad : Five types of Ethical Theories
- William K. Frankena : Ethics
- R.A.P. Rogers : A short History of Ethics
- A.C. Eving : Ethics
- S.K. Maitra : The Ethics of Hindus
- वेद प्रकाश वर्मा : नीतिशास्त्र के मूल सिद्धान्त
- संगम लाल पाण्डेय : नीतिशास्त्र का सर्वेक्षण
- बी०एन०सिंह : नीतिशास्त्र
- हृदय नारायण मिश्र : नीतिशास्त्र के प्रमुख सिद्धान्त



History
301- History of India (1740-1947)

Marks- 100 Credits- 4

Unit – I

Anglo-French rivalry.

Rise of the British Power in Bengal.

Plassey and Buxar-Causes and Significance

Clive's second governorship of Bengal

Warren Hastings-Reforms and relation with Avadh, Marathas and Maysore.

Cornwallis and his Reforms.

Unit – II

Wellesly-Subsidiary Alliance and Second Anglo-Maratha war.

William Bentinck-Reforms.

Lord Dalhousie-Reforms and Doctrine of Lapse.

Career and Achievements of Ranjit Singh.

First and Second Anglo-Burmese war.

Unit – III

First Anglo-Afghan war.

Upheaval of 1857.

Administration of Lytton, Ripon and Curzon.

Unit – IV

The Government of India Act-1909, 1919 and 1935.

Growth of Communalism and the Partition of India.

Books Recommended

- History of British India-P.E. Roberts.
- आधुनिक भारत का इतिहास—जयशंकर प्रसाद मिश्र
- आधुनिक भारत—तीन खण्डों में—छाबड़ा
- आधुनिक भारत का इतिहास—रामलखन शुक्ला
- आधुनिक भारत—बी०आर० ग्रोवर



Political Science
301- An Outline History of Western Political Thought

Marks- 100 Credits- 4

Unit – I

Plato, Aristotle, Cicero

Unit – II

Main Characteristics of Medieval Political Thought and the Church-State Controversy; St. Thomas Aquinas; Machiavelli; Jean Bodin; Montesquieu

Unit – III

Thomas Hobbs; John Locke; J.J. Rousseau; Jeremy Bentham; J. S. Mill

Unit – IV

Hegel; Karl Marx; T.H. Green; H.J. Laski

Recommended Books

- C.L. Wayer: Political thought (हिन्दी में भी उपलब्ध)
- Dunning: A History of Political Theories, Vol. 1-4
- J.P. Suda: History of Political Thought, Vol. 1-3 (हिन्दी में भी उपलब्ध)
- जीवन मेहता : राजीतिक चिन्तन का इतिहास
- प्रभुदत्त शर्मा : राजनीतिक चिन्तन का इतिहास



Economics

301- National Income Analysis, Money and Banking

Marks- 100 Credits- 4

Unit – I: National Income Analysis: Concept and methods of measurement; Circular flow of product and income, Government and foreign sectors in national income accounts. Determination of National income under classical and Keynesian system. Monetary theories of trade cycle.

Unit – II: Value of Money: Fisher and Cambridge approaches. Income-expenditure approach. Keynes' quantity theory. Prices: inflation, deflation. Monetary approach. Keynesian approach. Non-monetary theories of inflation. Effects of deflation. A brief discussion of relationship between inflation and unemployment (Philips curve and modified Philip's curve), Concept of stagflation.

Unit – III: Banking: Types and function. Structure and management, assets and liabilities, creation of money. Commercial Bankings: Principles and Practices. Central Banking: Instrument of monetary control and other functions of Central Banks. Indian Monetary Market: Structure, concept and sources of change in money supply, Reserve Bank of India, regulatory and promotional functions.

Unit – IV: Foreign Exchange: Concept , demand and supply of foreign exchange; external value of money-gold standard, exchange rate determination, purchasing power parity, theory, International monetary institution-IMF and IBRD. Exchange Control, Objectives and Methods.

Books Recommended:

- Manihara, K. K. – Monetary Theory
- Crowther, G. – An Outline of Money
- Halm, G. N. – Monetary Theory / Mudra Siddhant (in Hindi)
- Makinen, Gale – Money: The Price Level and Interest Rate
- Dillard, D. – Keynes Ka Arthashastra
- Ghosh, Alak – Indian Economy
- Rudra Dutt & Sudaram - Indian Economy
- Samuelson, P. A. – Economics
- Stonier & Hague – A Text Book of Economic Theory
- डॉ. जे. पी. मिश्र – मुद्रा बैंकिंग एवं अन्तर्राष्ट्रीय व्यापार
- डॉ. एम. एल. सेठ – मुद्रा बैंकिंग एवं अन्तर्राष्ट्रीय अर्थशास्त्र



Geography
301- Economic Geography

Marks- 75 Credits- 3

Unit-I: Nature, Scope and development of Economic Geography. Major concepts- Economic landscape, Stages of economic development, typology of economic activities (Primary, secondary, tertiary, quaternary) Resource-concept and classification.

Unit-II: Soil and major soil types, Forest types and their products ; Agricultural Land use and Locational theory by Von Thunen; Distribution production and international trade of principal crops rice, wheat, sugarcane, cotton tea, coffee and rubber, Agricultural regions of the world by Whittlesey.

Unit-III: Marine resources and Aquaculture-Major Fishing Areas, their production and trade. Nature of Occurrence, distribution, production and trade of minerals- Iron ore, Manganese, Bauxite, Copper, Mica and Gold (in major producing countries) Power Resources Production and utilization of coal, Petroleum, Hydroelectricity and atomic energy.

Unit-IV: Location factors of Industries and their relative significance, Webers theory of Industrial location. Types of industries, Location patterns and development trends of Manufacturing industries-Iron and steel, Textiles, Ship Building, Sugar, Paper and Chemicals, Major Industrial regions of U.S.A. U.K. and Japan.

Unit-V: Means and modes of transport-major trans continental railways, International Air and Sea routes; inland water ways (Panama and Suez Canals); Changing pattern of international Trades, Major Trade organizations and trade blocks- COMECON, EFTA, ASEAN, NAFTA, OPEC-their objectives and trade relations.

Books Recommended

- Alexander, J.W., Economic Geography, Prentice-Hall, New Delhi.
- Robinson, A.H. Jones, C.F. and Darkenwarld G.G. Principles of Economic Geography.
- Boesh, Hans, A Geography of World Economy, Von Nostrand, New York.
- Bengston and Royen, Fundamentals of Economic Geography.
- Zimmerman, E.W. Introduction to World Resources.
- Chisholm, M., Modern World Development-A Geographical Perspective.
- Singh, K.N. & Singh, J., Arthik Bhoogol ke Mool tatva (Hindi), Gyanodaya Prakashan, Gorakhpur.
- Jain, P, Arthik Bhoogol ki Samiksha (Hindi)
- Srivastava, V.K. & Rao, B.P. Arthik Bhoogol.
- Wheeler, J.O. et al ; Economic Geography, John Wiley, New York 1995.
- Robertson, D (ed.) Globalization and Environment, E.Elgas Co. U.K.,2001.



Pedagogy Related
301- Educational Management and Leadership

Marks- 100 Credits- 4

Objectives

The student- teachers will be able to:-

1. Appreciate the Principles, Meaning, Scope, Importance and advantages of School Management.
2. Get acquainted with the concepts of School discipline, School administration, Management, Supervision and Human Relations.
3. Acquire the needed competencies to achieve excellence in managing a school/ classroom.

Contents

Unit I: Concept of School Management

- (a) Meaning and Scope of School Management: Difference between management and leadership.
- (b) Nature and Importance of Management processes.
- (c) Fundamental Principles of School Management Leadership in the present context.

Unit II: Maintaining a Secondary School for attaining excellence

- (a) Planning and Executing: Year-plan of the School activities, Work load, School timings, time-table.
- (b) Controlling and Monitoring Duties and Functions of Head master, Supervisor, teacher and non-teaching staff. Forming committees, Co-ordination committee; governing body of the School and its role and functions. Supervision and Inspection-Meaning, type, purpose and procedure.
- (c) Financing: Sources of grants, budgeting and auditing procedure, Income generation- Endowment funds, reserve funds and development funds.

Unit III: Management and Leadership

- (a) Concept and Importance of Classroom Management and leadership differentiated.
- (b) Difference between School and Classroom Management, School management and School Organization, School Management and School administration.
- (c) School Administration: meaning and types. Academic leadership: Situational leadership style (SLS).



(d) School discipline: Concept and its development.

(e) Human Relations in a school set up.

Unit IV: Achieving Excellence through leadership

(a) Criteria of grading a School.

(b) Total Quality Management (TQM): Concept, objectives and importance.

(c) SWOT Analysis: Concept and its Educational Implications.

(d) Resource development- Human, Material and Finance.

Assignment

Locating Strength and Weaknesses of any Educational Institution.

Transactional Strategies

The course content will be transacted through lectures, discussions, tutorials and report preparations.

Evaluation

The course content will be of 4 credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be awarded on the basis of sessional work.

Readings

- Agarwal, J.C. (1967), Educational Administration, Arya Book Depot, New Delhi.
- Bhatnagar and Varma, (1978), Educational Administration, Loyal Book Depot, Meerut.
- Bush, T. (1980), Approaches to School Management, Harper & Raw, London.
- Khanna and Others (1983), School Administration, Planning, Supervision and Financing, Doaba House, Delhi.
- Kochhar, S.K. (1964), Secondary School Administration, University Publishers, Delhi.
- Mathur and Kohli, (1970). School Administration and Organization, Krishna Brothers, Jalandhar.
- Mukhopadhyay, M., Management of Change in Education, In search of India Model, NUEPA, New Delhi.
- Neelam Sood (2003), Management of School Education, A.P.H, New Delhi.
- Saffaya and Shaida (1980), School Administration and Organization, Dhanpat Rai and Sons, Jalandhar.
- Mukhapadhyay, Marmer, Total Quality Management in Education, NIEPA, 2001, New Delhi.



302- Educational Measurement and Evaluation

Marks- 100 Credits- 4

Objectives

The student teacher will be able to:-

1. Grasp the basic concepts in measurement and evaluation.
2. Develop skills and competencies for the use of basic techniques in the field of measurement and evaluation.
3. Acquire skills about test designing.
4. Understand the use of relevant statistical measures and their applications.

Contents

Unit- I: Concept and Techniques of Evaluation

- (a) Educational Measurement and Evaluation: Concept, Purpose, Tools and Techniques of evaluation: Levels of measurement-nominal, ordinal, interval and ratio. Taxonomy of educational objectives and its relevance for measurement and evaluation.
- (b) New concepts of Evaluation – Formative, Summative and Continuous-and-Comprehensive-Evaluation (CCE).
- (c) Norm Referenced and Criterion Referenced Testing (NRT and CRT).

Unit- II: Designing of tests for evaluation of learning outcomes

- (a) Principles of test construction and standardization.
- (b) Characteristics of a good test- reliability, validity, objectivity and practicability.

Unit- III: Instructional Objectives and their use in test construction

- (a) Instructional Objectives and objective based evaluation.
- (b) Classification of test items-essay type and objective type test items and their construction procedures.

Unit -IV: Educational Statistics

- (a) Concept of statistics, Graphical representation of data.
- (b) Measures of Central Tendency- Mean, Median and Mode.
- (c) Measures of Variability- Quartile deviation, Average Deviation and Standard Deviation.
- (d) Percentiles and Percentile Rank.
- (e) Coefficient of correlation- Rank difference and Product moment.
- (f) Concept of scaling- C scaling and T scaling.



Assignment

Preparation and administration of an achievement test.

Transactional Strategies

The course content will be implemented mainly through lectures integrated with Information & Communication Technology (ICT). In addition to this, discussion, brainstorming and quiz sessions will be used as the transactional strategies particularly for units- I, II and III.

Evaluation

The course content will be of 4 credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be credited on the basis of evaluation of sessional work.

Readings

- Allen, J.P.B. and Davis (1977), Testing and Experimental Methods, Oxford University Press, London.
- Anastasi, A. (1968), Psychological Testing : McMillan and Co .London.
- Bloom, B.S. (1968), Taxonomy of Educational Objectives, David McKay Co., New York.
- Ebel, R.L. (1979), Essential of Educational Measurement and Evaluation, Prentice Hall, New Delhi.
- Garrett, Henry E. (2004), Statistics in Psychology and Education (Tenth Indian Reprint), Vakils, Feffer and Simons Ltd, New Delhi.
- Gupta, S.P. (1993), Measurement and Evaluation, Sharda Publications, Allahabad.
- Nunally, J.C. (1972), Educational Measurement and Evaluation, McGraw Hill Book Company, New York.
- Singh, A.K. (2006), Tests, Measurement and Research Methods in Behavioral Sciences, Bharti Bhawan Printers, Patna.
- Thorndike R.L. & Hagen, E. (1969), Measurement and Evaluation in Psychology and Education, Tata McGraw, New Delhi.
- Pandey, K.P., Fundamentals of Educational Measurement and Evaluation, Vishwavidyalaya Prakashan, Varanasi.



SEMESTER-IV

हिन्दी 401— हिन्दी साहित्य का इतिहास

Credits-4

इस प्रश्नपत्र में अंकों का विभाजन इस प्रकार रहेगा—

निबन्धात्मक प्रश्न — 4 x 20 = 80 अंक

4 लघु उत्तरीय प्रश्न — 4 x 5 = 20 अंक

पूर्णांक : 100

1. हिन्दी साहित्य के इतिहास का काल—विभाजन, सीमा और नामकरण (प्रमुख विद्वानों के मत)।
2. आदिकाल की प्रमुख रचनाएँ और प्रवृत्तियाँ।
3. भक्ति आन्दोलन के कारण तथा भक्ति का उदभव और विकास।
4. भक्तिकाल की प्रमुख काव्यधाराओं की प्रमुख प्रवृत्तियाँ।
5. भक्तिकाल की सामान्य विशेषताएँ।
6. रीतिकाल का नामकरण, विभिन्न धाराएँ तथा प्रवृत्तियाँ।
7. श्रृंगारेतर काव्य प्रवृत्तियाँ—नीति काव्य, भक्ति काव्य तथा वीर काव्य की प्रवृत्तियों का सामान्य परिचय।
8. आधुनिक काल (कविता)—(क) भारतेन्दुयुगीन काव्य प्रवृत्तियाँ (ख) द्विवेदीयुगीन काव्य और उसकी प्रवृत्तियाँ (ग) छायावाद, प्रगतिवाद, प्रयोगवाद तथा नयी कविता : स्वरूप और प्रवृत्तियाँ।
9. आधुनिक हिन्दी (गद्य) की विभिन्न विधाओं (निबन्ध, नाटक, एकांकी, कहानी, उपन्यास, आलोचना) का विकासात्मक परिचय।

सहायक ग्रंथ :

- | | |
|---------------------------|--|
| ➤ पं० रामचन्द्र शुक्ल | — हिन्दी साहित्य का इतिहास |
| ➤ डॉ० लक्ष्मीसागर वाष्णीय | — हिन्दी साहित्य का इतिहास |
| ➤ डॉ० रामकुमार वर्मा | — हिन्दी साहित्य का आलोचनात्मक इतिहास |
| ➤ डॉ० वासुदेव सिंह | — हिन्दी साहित्य का समीक्षात्मक इतिहास |
| ➤ डॉ० त्रिभुवन सिंह | — हिन्दी साहित्य : एक परिचय |
| ➤ डॉ० रामस्वरूप चतुर्वेदी | — हिन्दी साहित्य और संवेदना का विकास |
| ➤ डॉ० रामचन्द्र तिवारी | — हिन्दी का गद्य साहित्य |
| ➤ डॉ० बच्चन सिंह | — हिन्दी साहित्य का दूसरा इतिहास। |

English Literature

401- Fiction

Marks-100 Credits-4

Unit-I : Ten short-answer questions based on the entire course.

Unit-II : Forms and Techniques, Elements of Novel, Elements of Short Story, Picaresque Novel, Historical Novel, Gothic Novel Epistolary Novel, Regional Novel, Dystopia, Detective Novel, Campus Fiction, Science Fiction, Space Fiction, Metafiction, 'Chic Lit', Junk Fiction Plot, Characterization, Narrative Technique and Structure

Unit-III:

Jane Austen Pride and Prejudice

Unit-IV:

Charles Dickens David Copperfield

Unit-V:

Thomas Hardy The Mayor of Casterbridge

Q.No.1- Ten short-answer questions based on the entire course. 20 Marks

Q.No.2-4- Long answer questions on prescribed novels. 20+20+20 = 60 Marks

Q.No.5- Two questions one on technique and one on forms of novel. 20 Marks



संस्कृत

401— काव्य एवं कवि-परिचय

पूर्णांक—100 Credits- 4

इकाई (i)	— किरातार्जुनीयम् प्रथम सर्ग	40
इकाई (ii)	— शुकनासोपदेशः	30
इकाई (iii)	— वाल्मीकि एवं व्यास	10
इकाई (iv)	— अधोलिखित कवि और उनकी कृतियाँ	20
भास, शूद्रक, अश्वघोष, भवभूति, श्रीहर्ष, विशाखदत्त, भट्टनारायण, सुबन्धु, दण्डी और जयदेव।		

संस्तुत ग्रन्थ

➤ किरातार्जुनीयम्	— प्रो० राजेन्द्र मिश्र
➤ किरातार्जुनीयम्	— डॉ० शिवबालक द्विवेदी
➤ किरातार्जुनीयम्	— प्रो० श्रीनिवास ओझा
➤ किरातार्जुनीयम्	— डॉ० रामसेवक दूबे
➤ शुकनासोपदेशः	— डॉ० तारणीश झा
➤ संस्कृत-कविदर्शन	— डॉ० भोलाशंकर व्यास
➤ संस्कृत-साहित्य की रूपरेखा	— पं० चन्द्रशेखर पाण्डेय
➤ संस्कृत-साहित्य का इतिहास	— पं० बलदेव उपाध्याय
➤ संस्कृत-साहित्य का समालोचनात्मक इतिहास	— प्रो० रामविलास चौधरी

Psychology
401- Social Psychology

Marks-75 Credits-3

Unit-I : Social Psychology : Nature and Scope, Historical background, Theories – Role, Learning and Cognitive theories. Methods of Study- Experimental, Quasi-experimental, Field study, Survey, Interview and Cross-Cultural method

Unit-II : Social Perception : Meaning and determinants. Person perception : Impression formation, determinants, Causal Attribution theory. Attitude: Meaning, components, characteristics, measurement- Thurston, Likert, Semantic Differential. Attitude formation and Change: Persuasion and resistance to change, Theories-Balance and Cognitive Dissonance.

Unit-III : Interpersonal Attraction: Meaning, measurement, determinants. Social influence-Conformity, Obedience and Compliance. Aggression and Violence : Influencing factors, Violence in society. Helping and Prosocial Behaviour - Meaning, theories and determinants.

Unit-IV : Social group : Meaning, Types, Characteristics – cohesiveness, effectiveness, group dynamics. Leadership- Meaning, types, theories. Intergroup behaviour – Prejudice and Discrimination. Intergroup conflict : causes and methods of resolution.

Books Recommended :

- Alcock, J. E. Carment, D.W. Sadava, S.W. Collins, J. E., Green, J. M. (1997). A Text Book of Social Psychology. Scarborough, Ontario: Prentice Hall.
- Baron, R. A. Byrne, D. (2002). Social psychology. New Delhi: Prentice Hall.
- Feldman, R. S. (1985). Social Psychology: Theories, Research and Application. New York: McGraw Hill.
- Myers, David, G (1994). Exploring Social Psychology. New York: McGraw Hill
- सिंह, अरुण कुमार (2003) : सामाजिक मनोविज्ञान की रूपरेखा, मोतीलाल बनारसी दास, वाराणसी
- त्रिपाठी, एल.बी. (2005) : आधुनिक सामाजिक मनोविज्ञान, हर प्रसाद भार्गव, आगरा
- सिंह, आर.एन. (2005) : आधुनिक सामाजिक मनोविज्ञान, द्वितीय संस्करण, अग्रवाल प्रकाशन, आगरा।



Psychology
401- Practical

Marks-50 Credits-2

(Any 8 of the following 10 practicals)

(निम्नलिखित 10 में से कोई 8 प्रायोगिक कार्य)

1. Person Perception (व्यक्ति प्रत्यक्षण)
2. Sociometry (समाजमिति)
3. Measurement of attitude (अभिवृत्ति का मापन)
4. Measurement of Social conformity (सामाजिक अनुरूपता का मापन)
5. Study of Caste Prejudice (जाति पूर्वाग्रह का अध्ययन)
6. Measurement of Adjustment (समायोजन का मापन)
7. Measurement of Depression (अवसाद का मापन)
8. Measurement of Anxiety (चिन्ता का मापन)
9. Measurement of Mental Health (मानसिक स्वास्थ्य का मापन)
10. Measurement of Insecurity (असुरक्षा का मापन)



Sociology
Social Change and Social Control

Marks-100 Credits-4

Objectives

Social change and Social Control have always been a central concern of Sociological study. So far as Social Change is concern, it has gained in salience Partly because of its unprecedented rapidity and partly because of its planned character. The course is designed to achieve all aspect of social change as well as of Social Control.

Unit-I: Social Change: Meaning. Nature and factors of Social Change: Biological Factors. Demographic Factors, Technological Factors, Economic Factors Cultural Factors, Info-tech factors.

Unit-II: Theories of Social Change: Demographic and Biological Theories: Evolutionary, Diffusionist and Marxist theory, Technological Deterministic Theory, Linear and Cyclical theories of Social change.

Unit-III: OTHER CONCEPTS RELATING TO SOCIAL CHANGE: Social process: Industrialization, Urbanization, Mordernization and Sanskritization Social Evolution, Social Change in India

Unit-IV: Social Control: Definition, Need and Importance of Social Control, Types of Social Control, Theories of Social control Agencies of Social Control: Family, Propaganda, Public Opinion, Education and State, Religion.

Essential Reading :

- Bottommore. T.B. 1972, SOCIOLOGY: A guide to problems and literature.
- Bombay : George Allen and Union (India).
- Gillin and Gillin, Cultural Sociology : The Mac millan and co.New York. 1950.
- Kingsley Davis- Human Society, The Mac millan and co.New York. 1959.
- W.E. Moore, Social Change, Prentice-Hall of India. New Delhi 1965.
- Herbert Spencer; First principles, New York 1906.
- W.F. Ogburn and M.F. Nimkoff: A handbook of Socioloty, Routledge and Kegan Paul Ltd. London 1960.
- MacIver and Page, Society, London 1953.



Philosophy
401- Logic

Marks-100 Credits-4

Unit-I : Definition, nature and importance of Logic, Truth and Validity, Induction and deduction, Sentence and Proposition, Kinds of Definition, Informal fallacies, Chief functions of Language.

Unit-II : Categorical Proposition, Aristotle's Traditional Square of Opposition and other Immediate Inferences. Existential Import, Categorical Syllogism. Testing Validity and Invalidity of Categorical Syllogisms through Venn Diagram and Laws regarding it.

Unit-III : Symbolic Logic, Simple and Compound Propositions, Kinds of Compound Propositions- Negative, Conjunctive, Disjunctive and Implicative Propositions, Testing Validity and Invalidity of Propositions through Truth-table method. Argument- form and Sentence- Form, Kinds of Sentence- Form, Determination of Tautology, Contingent and Contradictoriness through Truth- table Method.

Unit-IV : Inductive logic – Scientific Hypothesis, Scientific Explanation, Importance of Science, Methods of Mill for Inductive Generalization.

Suggested Readings

- Introduction to Logic : Irving M. Copi
- L.S. Stebbing : A Modern Introduction to logic
- W.V. Quine : Methods of Logic
- Cohen & Nagel : Logic and Scientific Method.
- राम मूर्ति पाठक : तर्कशास्त्र प्रवेशिका
- अविनाश तिवारी : तर्कशास्त्र के सिद्धान्त
- बद्रीनाथ सिंह : तर्कशास्त्र की रूप रेखा
- संगम लाल पाण्डेय : तर्कशास्त्र का परिचय



History
401- History of Modern Europe (1789-1919)

Marks-100 Credits-4

Unit – I

French Revolution-Causes, Main phases and Consequences.

Emergence of Napoleon Bonaparte-Expansion, Consolidation and Downfall.

The Congress of Vienna 1815

Metternich-Forces of Conservation.

Unit – II

Making of the National States: Italy and Germany.

Revolutionary movements-1830, 1848 and Europe since 1871-1914.

Unit – III

Bismarckian Diplomacy, System of Alliances.

Easterns Question, Power Blocks and Alliances.

First World War-Causes, Expansion and Consequences.

Unit – IV

Economic Depression after First World War.

Russian Revolution of 1917-Causes and Effects.

Paris Peace Conference of 1919.

League of Nations-Achievements and Failure.

Books Recommended

- History of Modern Times-Hazen
- A Short History of Europe-H.A.L. Fisher
- आधुनिक यूरोप का इतिहास (द्वितीय खण्ड)—लाल बहादुर वर्मा
- आधुनिक यूरोप का इतिहास (द्वितीय खण्ड)—दीनानाथ वर्मा
- आधुनिक यूरोप का इतिहास—पार्थसारथी गुप्ता



Political Science
401- Comparative Government

Marks-100 Credits-4

Unit – I

United Kingdom– General Features; Constitutional Conventions; The Crown; Parliament; Cabinet System; The Rule of Law and Judicial System; The Party System.

Unit – II

U.S.A.– General Features; Federalism; President; Congress; Federal Judiciary; Method of Amendment of Constitution; Party System.

Unit – III

Switzerland– Main Features; Federal Executive; Federal Legislature; Judicial System; Devices of Direct Democracy; Method of Amendment in the Constitution.

Unit – IV

China– Social and Economic System, Historical Background and features, Central Executive-President and State Council, Central Legislature– National People's Congress and its Permanent Committee, Judicial System, Communist Party.

Recommended Books

- A.C. Kapur: Select Modern
- K.R. Bombwall: Select Constitutions
- J.C. Jauhari: Major Modern Political Systems
- हरिमोहन जैन: तीन संविधान
- पुखराज जैन: विष्व के प्रमुख संविधान



Economics
401- Public Finance and International Trade

Marks-100 Credits-4

Unit – I

Private and Public Goods, Principle of maximum social advantage Government Budget: Preparation and classification, Sources of Public Revenue, Taxation. Theories of Taxation the benefit approach, the ability to pay approach; incidence and effects of taxation.

Unit – II

Public Expenditure: Wagner's law, Wiseman-Peacock hypothesis, the critical limit hypothesis.

Classification of Public Expenditure: Effects of public expenditure on production and distribution. Public Debt: Classification, effects, burden, repayment and management.

Unit – III

Fiscal Policy: Stability and Economic growth. Indian Public Finance: Sources of income Central, State, Indian Tax System. Public expenditure in India. Indian Federal Finance.

Unit – IV

International Trade: Theory of comparative cost. Refinements-Opportunity cost. Reciprocal demand analysis. Terms of Trade: Concepts and measurement. Free trade and protection. Tariff and non-tariff methods. The balance of payments: Equilibrium and disequilibrium. Foreign trade of India and trade policy.

Books Recommended:

- H. Dalton – Public Finance
- H. L. Bhatia - Public Finance
- Alen and Brownley - Public Finance
- Samuelson, P. A. – Economics
- डॉ. जे. पी. मिश्र – लोक वित्त
- डॉ. जे. पी. मिश्र – अन्तर्राष्ट्रीय अर्थशास्त्र
- डॉ. टी. एन. हजेला – राजस्व के सिद्धान्त



Geography
401- Geography of India

Marks-75 Credits-3

Unit-I

India in the context of Asia and the world : Structure, Relief and Drainage System; Major Physiographic regions of India; The Indian Monsoon-origin and characteristics, effect of El Nino and La Nina, climatic division, Soil types and conservation.

Unit-II

Natural vegetation and Forest resources-their utilization and conservation ; Power resources (water, Coal, Mineral oil and Atomic) and Mineral resources (Iron ore, Bauxite, Mica, Manganese) their reserve, distribution, production, trade and conservation. River Valley Projects with special reference to Tehri dam & Narmada Valley project.

Unit-III

Indian Economy: Agriculture - main characteristic and problems of Indian agriculture; Irrigation, mechanization and Green Revolution; post revolution scenario-recent trends; Major Agricultural regions. Industries - Location factors; development and spatial pattern of major industries (Iron and Steel, Textiles, Cement, Sugar, Paper, Oil Refinery and Fertilizers) Major Industrial regions/complexes.

Unit-IV

Population growth, distribution and density, demographic and occupational structure, Population problems, Literacy, Urbanization with special reference to post-Independence period, Population problems. Transport and Trade- Development of Transport Net-work Rail and road development and air routes; Foreign trade-salient features, recent trends and trade direction, Major ports and cities.

Unit-V

Regional development & disparities after Independence; Major issues and planning of some problem areas Flood prone areas, Drought prone areas and Tribal areas. Detailed geographical study of Uttar Pradesh.



Book Recommended

- Spate, O.H.K. & Learmonth A.T.A. India and Pakistan
- Singh R.L. (ed), India-A Regional Geography, NGSI, Varanasi
- Sen Gupta, P., Economic Regions and Regionalization of India.
- Mitra Ashok, Levels of Economic Development of India.
- Singh, J., India-A Comprehensive Systematic Geography, Gyanodaya Prakashan, Gorakhpur.
- Sharma, T.C. & Countino, O., Economic Geography of India.
- Verma, R.V. Geography of India (Hindi)
- Bansal, S.C., Geography of India (Hindi)
- Gopal Singh, Geography of India
- Ramamurti, Geography of India Systematic.
- Tiwari, R.C., Geography of India, Prayag Pustak Bhawan, Allahabad.
- Nag, P and Sivita Sen Gupta (1992) India, Concept Publishing Co., New, Delhi.



Geography
401- Practical

Marks-50 Credits-2

Lab Work

Unit-I: Statistical Analysis (i) Measures of Central Tendency- Mean, Median, Mode. Measures of Dispersion-Quartile range, Standard Deviation, Variance and Coefficient of variation. Correlation and Co-efficient of correlation.

(ii) Graphical Representation of Statistical Data-Histogram, Polygon, Frequency Curve, Scatter Diagram.

Unit-II: Cartographic Representation of Statistical Data

(i) Graphs: Band graph, Hythergraph, Climograph.

(ii) Diagrams: Compound Bar, Wheel, Rectangle, Circle.

(iii) Distribution Maps: Using Dots, Isopleth and Choropleth method.

Unit-III: Weather Maps Use of weather instruments and weather symbols (Indian) Study and Interpretation of Indian daily Weather maps/ reports especially of January, March, July and October, Weather forecasting.

Unit-IV: Geological Maps Identification of rock-outcrops, bedding planes, Drawing of cross-section and determination of dip and bed thickness-simple and folded.

(B) Viva-Voce & Sessional Records

Division of Marks

(A) Lab Work: One question from each unit with internal choice, Duration three hours.

40 Marks

(B) Viva-Voce & Sessional Records -

10 Marks

Books Recommended

- Monkhouse, F.J. Maps & Diagrams.
- Robinson, A.H., Elements of Cartography.
- Gregory, S., Statistical Method and the Geographer.
- Smith, H.T.V. Aerial Photographs and their Applications.



- Singh, R.L., Elements of Practical Geography.
- Sing, L.R. & Singh, R.N. Map work and practical Geography (Eng./Hindi).
- Sharma, J.P. Prayogatmak Bhoogol Ki Rooprekha (Hindi).
- Hira Lal, Prayogatmak Bhoogol Ke Adhar (Hindi).
- Singh, J. et. al, Bhaumikiya manchitro ki Rooprekha (Hindi).
- Lal, Hira, Matratmak Bhoogol (Hindi).
- Tiwari, R.C. and Tiwari, Sudha, Abhinav Prayogic Bhoogol.



Pedagogy Related
401- Action Research in Education

Marks-100 Credits-4

Objective – After taking this course, the student will be able to:

1. Explain the meaning and importance of action research with reference to Indian schools.
2. Use various steps involved in action research in a school.
3. Design and implement school based action research project.
4. Use Action research strategy for improving school practices.

Content

Unit-I: Meaning and types of research- fundamental, applied and action research, difference between traditional (fundamental and applied) research and action research.

Unit-II: Action research for improving class room and school based programmes: Illustrative example in specific areas for use of action research interventions in teaching, learning, co-scholastic areas and organizational climate of a school.

Unit-III: Procedure of designing action research: Selection of problem, Formulation of action hypotheses and developing a suitable design for testing of such hypotheses, Evaluation of results in action research and their use.

Unit-IV: Developing school based projects for action research; Format of a project and its implementation. Determining intervention based effects in terms of pre-post comparison: Precautions needed. Formulating an action research based report for the benefit of other practitioners.

Assignment

Study on any one environmental problem. The report on the study must include efforts of the pupil teacher in developing awareness among people about that environmental problems.

Transactional Strategies

The course will be transacted through lecture-cum-demonstration sessions with major segment of the course devoted to formulation, implementation and evaluation of action research interventions relevant for a secondary school. The course transaction will also include group- discussions, brainstorming and interactive sessions.



Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be credited on the basis of evaluation of sessional work.

Readings

- Best, John W. (1998), Research in Education, Prentice Hall of India, New Delhi.
- Cohen, L. and Manion, L.(1980), Research Methods in Education, Croom Helm London.
- Koul, L. (1984), Methodology of Educational Research, Vikas Publishing House, New Delhi.
- Pandey, K. P. (2010), Action Research in Education, Vinod Pustak Mandir, Agra.
- Pandey, K.P. (2008), Fundamental of Educational Research, Vishwavidyalaya Prakashan, Varanasi.



402- Environmental Education

Marks-100 Credits-4

Objectives

The student-teachers will be able to:-

1. Understand the problems of environment and its use.
2. Acquire various skills in training the students about environmental education.

Contents

Unit-I: Information about Environmental Education

- (a) Concept of Environmental Education and Need of Environmental Education.
- (b) Objectives of Environmental Education at Secondary School Level.
- (c) Methodologies of Environmental Education.
- (d) Curriculum Development in Environmental Education.

Unit-II: Global Environmental Issues

- (a) Components of Environment.
- (b) Concept of healthy environment & efforts made in this direction.
- (c) Global Environment issues:
 - i. Conservation of environment: government commitment in national and international fields.
 - ii. Depletion of ozone layer.
 - iii. Global warming (greenhouse effect).

Unit-III: Pollution

Environmental Pollution: Various types of pollution and strategies for addressing them.

Unit-IV: Role of Schools and teachers in improving the quality of environment

- (a) What can schools do?
- (b) What can teachers do?
- (c) What are the various agencies with which schools can collaborate?
- (d) Environmental management at micro and macro level.

Assignment

Study on any one environmental problem. The report on the study must include efforts of the pupil teacher in developing awareness among people about the concerned environmental problems.



Transactional Strategies

The course will be transacted through lecture-cum-demonstration sessions with major segment of the course devoted to formulation, implementation and evaluation of action research interventions relevant for a secondary school. The course transaction will also include group- discussions, brainstorming and interactive sessions.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be credited on the basis of evaluation of sessional work.

Readings

- Center, E.W. (1977), Environmental Impact Assessment, McGraw Hill Co., New York.
- Fedron, E. (1980), Man and Nature, Progress Publishers, Moscow.
- Gupta, V.K. (1998), Environmental Education, New Academic Publishing House, Jalandhar.
- Kormondy, E. (1991), Concept of Ecology, Prentice Hall of India, New Delhi.
- Odem, E.P. (1975), Ecology, Oxford and IBH Publishing Co., New Delhi.
- Plamer, J. & Philips, N. (1994) The Handbook of Environmental Education, Routledge, London & New York.
- Purdom, P.W. & Anderson, S.H. (1980), Environmental Science, Charles E. Merrill Publishing Co., Columbus.
- Pandey, K.P., Bhardwaj and Pandey, Asha (2005), Environmental Education (Hindi), Vishwavidyalaya Prakashan, Varanasi.
- Saxena, A.B. (1966), Education for the Environmental Concerns: Implications and Predices, Radha Publications, New Delhi.
- Sharma, P.D. (1998), Environmental Biology, Rastogi & Co., Meerut.
- Sharma, R.C., & Tan, M.C. (1990), Source Book of Environmental Education for Secondary School Teachers(ed); UNESCO, Bangkok.
- UNESCO (1977), Trends in Environmental Education, UNESCO, Paris.



SEMESTER-V

हिन्दी

501- साहित्य सिद्धान्त और आलोचना

Credits-4

अंक-विभाजन : 4 निबन्धात्मक प्रश्न - 4 x 20 = 80 अंक (तीन प्रश्न साहित्य-सिद्धान्त तथा एक प्रश्न हिन्दी-आलोचना से करना अनिवार्य होगा।)

4 लघुउत्तरीय प्रश्न - 4 x 5 = 20 अंक

पूर्णांक : 100

प्रथम खण्ड

1. भारतीय साहित्य सिद्धान्त

- (क) काव्य लक्षण, काव्य हेतु, काव्य प्रयोजन
- (ख) शब्द-शक्ति-अभिधा, लक्षणा तथा व्यंजना का लक्षण-उदाहरण सहित सामान्य परिचय।
- (ग) काव्य-गुण-माधुर्य, ओज तथा प्रसाद।
- (घ) काव्य-दोष-श्रुतिकटु, च्युतसंस्कृति, क्लिष्ट, ग्राम्य, न्यूनपद, अधिकपद, दुष्क्रम, स्वशब्द, वाच्य, पुनरुक्ति तथा अश्लील।
- (ङ) रस, अलंकार तथा ध्वनि सम्प्रदाय का सामान्य परिचय।

2. पाश्चात्य साहित्य-सिद्धान्त-

- (अ) प्लेटो की काव्य सम्बन्धी मान्यता।
- (ब) अरस्तू का अनुकरण एवं विरेचन सिद्धान्त।
- (स) मार्क्सवादी समीक्षा पद्धति।
- (द) शास्त्रवाद और स्वच्छन्दतावाद।

सहायक ग्रंथ :

- | | |
|---------------------------------------|--------------------------|
| ➤ भारतीय साहित्य शास्त्रकोश | - डॉ० राजवंश सहाय, हीरा |
| ➤ भारतीय काव्यशास्त्र की भूमिका | - डॉ० नगेन्द्र |
| ➤ भारतीय काव्यशास्त्र की नयी व्याख्या | - डॉ० राममूर्ति त्रिपाठी |
| ➤ भारतीय काव्यशास्त्र के सिद्धान्त | - डॉ० जगदीश प्रसाद मिश्र |
| ➤ पाश्चात्य काव्यशास्त्र | - डॉ० रामपूजन तिवारी |

द्वितीय खण्ड

हिन्दी आलोचना

1. आलोचना : स्वरूप एवं प्रकार।

2. आलोचक के प्रमुख गुण।

3. हिन्दी के प्रमुख आलोचकगण

(क) आचार्य पं० रामचन्द्र शुक्ल।

(ख) आचार्य पं० हजारी प्रसाद द्विवेदी।

(ग) पं० नन्ददुलारे वाजपेयी।

(घ) डॉ० रामविलास शर्मा।

सहायक ग्रंथ :

- | | |
|--|---------------------------|
| ➤ आलोचक और आलोचना | — डॉ० बच्चन सिंह |
| ➤ रामचन्द्र शुक्ल और हिन्दी आलोचना | — डॉ० रामविलास शर्मा |
| ➤ हिन्दी प्रत्यालोचना का उदभव और विकास | — डॉ० रामस्वारथ ठाकुर |
| ➤ हिन्दी समीक्षा : स्वरूप और संदर्भ | — डॉ० रामदरश मिश्र |
| ➤ हिन्दी में ऐतिहासिक आलोचना (विकास और परम्परा) | — डॉ० विजया त्रिपाठी |
| ➤ समीक्षा के मानदण्ड और हिन्दी समीक्षा की विशिष्ट प्रवृत्तियाँ | — डॉ० प्रताप नारायण टण्डन |
| ➤ हिन्दी आलोचना की आधुनिक प्रवृत्तियाँ और उन पर पाश्चात्य प्रभाव | — डॉ० शंकर लाल गुप्ता |
| ➤ शुक्लोत्तर हिन्दी आलोचना (नव्य हिन्दी समीक्षा) | — डॉ० कृष्णवल्लभ जोशी |
| ➤ शुक्लोत्तर काव्य—चिन्तन | — डॉ० श्यामबिहारी राय |
| ➤ शुक्लपूर्व आधुनिक हिन्दी आलोचना | — डॉ० मंगला प्रसाद सिंह |
| ➤ आधुनिक हिन्दी आलोचना | — डॉ० मन्मथलाल शर्मा |
| ➤ आधुनिक हिन्दी साहित्य में आलोचना का विकास | — डॉ० वेंकट शर्मा |
| ➤ आधुनिक हिन्दी साहित्य में आलोचना का विकास | — डॉ० रामकिशोर कक्कड़ |
| ➤ आधुनिक हिन्दी आलोचना | — डॉ० हरिमोहन मिश्र |
| ➤ आचार्य रामचन्द्र शुक्ल के साहित्य सिद्धान्त | — डॉ० रामकृपाल पाण्डेय |
| ➤ आचार्य रामचन्द्र शुक्ल के समीक्षा सिद्धान्त | — डॉ० रामलाल सिंह |
| ➤ नगेन्द्र की सैद्धान्तिक एवं व्यावहारिक समीक्षा | — एस० लक्ष्मी |
| ➤ पं० महावीर प्रसाद द्विवेदी का समीक्षा साहित्य | — रामशंकर शर्मा |

English Literature
501- History of English Literature

Marks-100 Credits-4

Unit-I : Ten short-answer questions based on the entire course.

Unit-II : From Renaissance to Seventeenth Century

Renaissance and Reformation

Miracle and Morality Plays

University Wits

Authorised version of the Bible

Metaphysical Poetry

Neo-classicism

Elizabethan Songs and Sonnets

Unit-III : Eighteenth Century and the Romantic Age

Growth of the Novel

Precursors of Romanticism

Romanticism and the French Revolution

Growth of Romantic Literature (Prose, Poetry, Drama and Novel)

Unit-IV: Nineteenth Century

Characteristics of Victorianism

Growth of Victorian Literature (Prose, Poetry, Drama and Novel)

Pre-Raphaelite Poetry

Naughty Nineties.

Unit-V : The Twentieth and Twenty-first centuries

Trends in twentieth century literature with special reference to

Georgian poetry, Imagism and Symbolism, Movement Poetry.

Twentieth Century Novel

Twentieth Century Drama, Problem Play, Theatre of the Absurd,

Expressionism, Epic Theatre.

Growth of Postcolonial literature: Feminism, Post modernism etc.

Q No. 1. Ten Short Answer questions based on the entire course.

20 Marks

Q No.2-5 One Long Answer question from each unit

4x20= 80 Marks



संस्कृत
501- काव्य

पूर्णांक-100 Credits- 4

इकाई (i)	— शिशुपालवधम्	प्रथम सर्ग-श्लोक 1-35	30
इकाई (ii)	— शिशुपालवधम्	प्रथम सर्ग-श्लोक 36-75	30
इकाई (iii)	— शिवराजविजयः	प्रथम निःश्वास	40

संस्तुत ग्रन्थः

- | | |
|---------------|--------------------------|
| ➤ शिशुपालवधम् | — डॉ० आद्याप्रसाद मिश्र |
| ➤ शिशुपालवधम् | — डॉ० केशवराम मुसलगाँवकर |
| ➤ शिशुपालवधम् | — डॉ० शिवबालक द्विवेदी |
| ➤ शिवराजविजयः | — डॉ० श्रीनिवास ओझा |
| ➤ शिवराजविजयः | — प्रो० ओमप्रकाश पाण्डेय |



Psychology

501- Psychological Assessment and Statistics

Marks-75 Credits-3

Unit-I: Scaling techniques and Measurement: Scaling techniques: Paired comparison, Rating and Ranking. Levels of Measurement: Nominal, interval, ordinal and ratio scales. Tests: Meaning and characteristics. Types of tests.

Unit-II: Nature of psychological data. Categorical and continuous variables. Application of statistics in psychology. Frequency Distribution : Drawing of frequency distribution, Graphical representation of data. Measures of Central Tendency: Characteristics and computation of Mean, Median and Mode. Measures of Variability: Range and Semi interquartile range, Standard deviation and Variance

Unit-III: Normal Distribution: Concept of probability, Characteristics of Normal Probability Curve, Deviations from Normal Probability Curve (NPC)–Skewness and kurtosis. Normalization of skewed distributions, Applications of NPC. Correlation: The concept of correlation. Linear and nonlinear correlation. Product moment correlation, Rank order correlation, Biserial and Point-biserial correlation.

Unit-IV: Standard error of mean, standard deviation and correlation, Nature and assumption of t- distribution, Computation of t-values for independent and dependent samples, Interpretation of t-values, level of significance, Type-I and Type-II errors in inference making. Chi square Test, Purpose and assumptions of Analysis of Variance (ANOVA): One-way analysis of variance.

Books Recommended

- Broota, K.D. (1992) Experimental Design in Behavioural Research, New Delhi, Wiley Eastern, Delhi
- Minium, E.W., King, B.M. & Bear, G. (1993). Statistical Reasoning in Psychology and Education, New York: John Wiley.
- Garrette, H.E. (1996), Statistics in Psychology and Education. Vakils, Feffer and Simons Ltd., Bombay
- मिश्रा, बी. एवं त्रिपाठी, एल.बी. (1990) : मनोवैज्ञानिक सांख्यिकी, हर प्रसाद भार्गव, आगरा।
- कपिल, एच.के. (2006) : सांख्यिकी के मूल तत्व, मोतीलाल बनारसी दास, वाराणसी।
- सिंह, राजवीर एवं राधेश्याम (2007) व्यवहार विज्ञानों के लिए वृहद सांख्यिकीय, सजय प्रकाशन, दिल्ली.
- भाटिया, आर.एस. (2007) आधुनिक मनोवैज्ञानिक सांख्यिकी, लावण्य प्रकाशन, उरई.



Sociology
501- Foundations of Sociological Thought

Marks-100 Credits-4

Objectives

Sociology originated as an intellectual response to the crisis confronting the mid nineteenth century European society. Its development over two century since then has been influenced by a variety of socio-economic and political conditions where it has been taught and practiced. It is now established as a multi-paradigmatic academic discipline, with its body of theoretical knowledge enriched and its methodological techniques and procedures systemized, Nevertheless, some of its original concerns have persisted and some of its classical theoretical and methodological landmarks are relevant even now.

This paper is intended to familiarize the students with the social, political, economic and intellectual contexts in which sociology emerged as a distinctive discipline. Its objective is to help students gain an understanding of some of the classical contributions in sociology and their continuing relevance to its contemporary concerns.

Course Outlines

Unit-I: The Emergence of sociology: Transition from social philosophy to sociology- The intellectual context. Enlightenment- The social, economic and political forces : The French and Industrial Revolutions.

Unit-II: Sociological Concepts: Sociological concepts and facts, Relation between concept and theory, Social system, Social structure

Unit-III: The pioneers Comte: positivism- Spencer: Social Darwinism superorganic evolution. The classical tradition: Durkheim: social solidarity, and suicide- Weber: authority and the concept of ideal type- Marx:materialist conception of History, Dialectical Materialism, and class struggle – Pareto: circulation of elites.

Unit-IV: Development of Sociological Thought in India: Indian Social Thought. Indiological Approach. Vedic Tradition. Shraman Tradition (Buddhism and Jainism). Indian Renaissance- Raja Ram Mohan Roy, Swami Dayanand Saraswati, Swami Vivekanand, Mahatma Gandhi.



Essential readings

- Aron, Raymond. 1967(1982 reprint). Main currents in sociological thoughts (2 volumes). Harmondsworth, Middlesex: Penguin Books.
- Barnes, H.E. 1959. Introduction to the history to the sociology. Chicago The University of Chicago press.
- Coser, Lewis A. 1979. Masters of Sociological Thought. New York : Harcourt Brance Jovanovich
- Fletcher, Ronald. 1994. The Making of Sociology (2 volumes) Jaipur-Rawat.
- Morrison, Ken. 1995 Marx, Durkheim, Weber: Formation of Modern Social Thought. London; sage.
- Ritzer, George. 1996. Sociological Theory. New Delhi. Tata-McGraw Hill.
- Singh, Yogendra. 1986 Indian Sociology: social conditioning and emerging Trends. New Delhi: Vistaar.
- Zeitlin, Irving. 1998 (Indian Edition). Rethinking sociology: A critique of Contemporary Theory. Jaipur: Rawat.
- Pandey, Ravi Prakash, 2009. (Hindi Edition). Sociological Theories: Approach & Perspective, Allahabad, Shekhar Prakashan.
- Pandey, Ravi Prakash, 2010 (Hindi Vth Edition). Indian Social Thought, Allahabad, Shekhar Prakashan.



Philosophy
501- Problems of Philosophy (Indian & Western)

Marks-100 Credits-4

Unit-I: Nature of Knowledge, Prama, Praman, Prameya & Pramaryavad, Theories of causation- Satkaryavad, Asatkaryavad, Parinamvad Vivartvad & Pratityasamutpad.

Unit-II: Theories regarding soul; Bhutachaitanyavad Anatmavad, Anekatmavad & Ekatomvad, Theories regarding reality Monism Dualism & Pluralism

Unit-III: Nature of Knowledge – Plato, Rationalism, Empiricism, & Criticism, Theories of Causation– Aristotle, Hume & Kant, Theories of Truth– Correspondence theory, Coherence Theory and Pragmatism.

Unit-IV: Creationism & Evolutionism, Creative evolutionism and Emergent evolutionism, Problem of Universal-Realism, Conceptualism & Nominalism, Problem of space & Time – Leibnitz & Kant.

Suggested Reading

- A.C. Eving : Some Fundamental questions of Philosophy
- A.D. Woozley : Theory of Knowledge
- H.M. Bhattacharya : Principles of Philosophy
- B. Russell : Problems of Metaphysics
- Machinen : Problems of Metaphysics
- A.J. Ayer : The Central Questions of Philosophy
- R.K. Tripathi : Problems of Philosophy and Religion
- K.C. Raja : Some Fundamental Problems of Indian Philosophy
- S.C. Chatterji : Nyaya Theory of Knowledge
- D.M. Datta : Six Ways of Knowing
- Radhakrishnan : Indian Philosophy Vol. I & II
- S.K. Maitra : Fundamental Questions of Indian Metaphysics & Logic
- राजेन्द्र प्रसाद : दर्शन की रूप रेखा
- हरिशंकर उपाध्याय : ज्ञानमीमांसा के मूल प्रश्न
- केदार नाथ तिवारी : तत्त्वमीमांसा एवं ज्ञानमीमांसा



- अशोक कुमार वर्मा : तत्त्वमीमांसा एवं ज्ञानमीमांसा
- बी०एन०सिंह : पाश्चात्य दर्शन की समस्याएँ एवं समकालीन दर्शन
- बी०एन०सिंह : प्रमाण परिचय
- वद्रीनाथ शुक्ल : तर्कभाषा (हिन्दी अनुवाद)
- डी० वंदिष्ठे : भारतीय दार्शनिक निबन्ध
- नन्द किशोर शर्मा : भारतीय दर्शन की समस्याएँ
- गीता रानी अग्रवाल : भारतीय ज्ञान मीमांसा
- वशिष्ठ नारायण सिन्हा : भारतीय दर्शन की समस्याएँ
- डॉ० हृदय नारायण मिश्र पाश्चात्य दर्शन



History

501- Indian National Movement (1857-1947)

Marks-100 Credits-4

Unit-I

Revolt of 1857-Causes, Nature, Failure and Aftermath.

Birth of Nationaslism.

Foundation of Indian National Congress.

Policies of Indian National Congress from 1885-1905.

Extremism-Ideas, Means and Movement.

Unit-II

Partition of Bengal and Swadeshi Movement.

Revolutionary Movement-Causes of its emergence and main activities in India.

Ghadar Party-Formation and Activities.

Hindustan Socialist Republican Association-Bhagat Singh and Batukeshwar Dutt.

Subhash Chandra Bose and Azad Hind Fauj.

Unit-III

Home Rule movement and Khilafat movement.

Gandhian Era.

Non-Co-Operation movement.

Simon Commission and Nehru Report.

Civil-Disobedience movement.

Unit-IV

Quit-India movement.

Rise of Communalism.

Partition of India.

Books Recommended

- History of Freedom Movement Vol-I, II, III-Dr. Tarachand.
- History of the Freedom Movement in India-R.C. Majumdar
- भारत का मुक्ति संग्राम-अयोध्या सिंह
- भारत का राष्ट्रीय आन्दोलन-इकबाल नारायण
- भारतीय स्वतन्त्रता संग्राम-शैलेन्द्र पान्थरी

Political Science
501- Principles of Public Administration

Marks-100 Credits-4

Unit- I: Meaning, Nature and Scope of Public Administration, Relation of Public Administration to other Social Sciences; Public and Private Administration; The Role of Public Administration in the Modern State; Responsive Administration.

Unit-II: Bases of Organization–Primacy of the Functional base; Principles of Organization; Hierarchy; Span of Control; Delegation of Authority; Centralization and decentralization; Control over Administration; Legislative, Executive and Judicial

Unit-III: The Chief Executive; Line, Staff and Auxiliary Agency; The Department; Public Corporation; Independent Regulatory Commission; Field Service agencies; Bureaucracy

Unit-IV: Personnel Administration: Recruitment, Training and Promotion; Position Classification; Public Relations; Financial Administration; Budget Audit

Recommended Books

- अवस्थी एवं माहेश्वरी : लोक प्रशासन (अंग्रेजी में भी उपलब्ध)
- सी०पी० भाम्भरी : लोक प्रशासन के सिद्धान्त (अंग्रेजी में भी उपलब्ध)
- इन्द्रजीत कौर : लोक प्रशासन— नए आयाम
- बी०एल० फाड़िया : लोक प्रशासन



Economics

501- Economics of the Less Developed Countries

Marks-100 Credits-4

Unit-I: Economic growth and economic development: Meaning measurement and distinction; Diverse structure and common characteristics of developing nations; obstacles to development, economic and non-economic factors in economic development, Patterns of resource endowments agricultural, Mineral energy.

Unit-II: Analytical perceptions of problems and policies: Vicious circles of poverty; Dualistic economic theories, Lewis model of labour surplus economy, Rosenstein Rodan's theory of big push, Leibenstein's critical minimum effort thesis, Nelson's level equilibrium trap; balanced versus unbalanced, Rostow's stages in theory of growth, poverty and inequality and unemployment.

Unit-III: Towards an equitable world economy: Trade and Economic development; Terms of trade, concepts, measurement, movements and prospects, international finance and financial restructuring, south-south cooperation, W.T.O. and development countries.

Unit-IV: Development and planning: need, concept, types, planning and the market, Formulation of plans. Objectives, strategy, Plan models, Mahalanobis model, Financing and achievements of Indian Five Year Plans.

Books Recommended:

- Todaro, M. P. – Economic Development in the Third World
- Thirlwal, A. P. – Growth and Development
- Ghatak, S. – Development Economics
- Meier, G. M. (Eds.) – Leading Issues in Economic Development
- Salvatore, D and E. Dowling - Development Economics, Schaum, Outline series in Economics
- Agarwala, A. N. and S. P. Singh (Eds.) – Economics of Under-development
- डॉ. जे. पी. मिश्र – संवृद्धि एवं विकास का अर्थशास्त्र
- डॉ. जे. पी. मिश्र – अल्प विकसित देशों का अर्थशास्त्र
- डॉ. एम. एल. झिंगन – विकास का अर्थशास्त्र एवं आयोजन



Geography
501- Geographical Thought

Marks-75 Credits-3

Unit-I: The field of geography; its place in the classification of sciences; geography as a selected concepts of geography-distributions; relationships, interactions, area differentiation and spatial organization.

Unit-II: Dualisms in geography; systematic & Regional geography; physical & human geography. Systematic geography & its relation with systematic sciences and with regional geography. The myth and reality about dualisms.

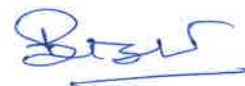
Unit-III: Geography in ancient period- Contribution of Indian, Greek & Roman geographers Geography in middleage- Arab geographers, Renaissance period in Europe. Renowned travellers and their geographical discoveries.

Unit-IV: German school of thought- Kant, Humboldt, Ritter, Richthofen, Ratzel, Hettner. French school of thought - Contribution of Blache & Brunhes.

Unit-V: Soviet geographers, American school- Contribution of Davis, Sample, Hunthington & Carl Sauer. British school- Contribution of Mackinder, Herbertson & L.D. Stamp.

Books Recommended

- Abler, Ronald; Adams, John S. Gould Peter: Spatial Organization: The Geographers View of the World, Prentice Hall, N.J. 1971.
- Ali S.M. : The Geography of Puranas, Peoples Publishing House, Delhi, 1966.
- Amedeo, Douglas: An introduction to Scientific Reasoning in Geography, John Wiley, U.S.A. 1971.
- Dikshit, R.D. (ed.) The Art & Science of Geography Integrated Readings, Prentice Hall of India, New Delhi-1994.
- Hartshorne, R: Perspective on Nature of Geography, Rand McNally & Co. 1959.
- Husain, M.: Evolution of Geographic Thought, Rawat Pub.: Jaipur. 1984.
- Johnston, R.J.: Philosophy and Human Geography, Edward Arnold London, 1983.
- Johnston, R.J.: The Future of Geography, Mehtuen, London, 1988.
- Minshull R.: The Changing Nature of Geography, Hutchinson University Library, London, 1970.



Pedagogy Related
501- Educational Technology

Marks-100 Credits-4

Objectives

The student teachers will be able to:-

1. Develop a total perspective of the role of technology and information science in modern educational practices.
2. Make various technological applications available for improving instructional practices.
3. Acquire knowledge about different aspects of teaching and communication process.
4. Acquire information about innovation in Educational Technology.
5. Learn skills required for effective instruction.

Contents

Unit-I: Concept of Educational Technology and Information Technology

- (a) Concept, Nature and Scope of Educational Technology; Difference between Technology in Education and Technology of Education
- (b) Approaches of Educational Technology- Hardware, Software and System Approach.
- (c) Applications of Educational Technology in improving theory and practices of education.
- (d) Concept and significance of Information Technology.
- (e) Different types of network: LAN, WAN, E- mail, Internet and World Wide Web.

Unit-II: Teaching and Communication Technology

- (a) Meaning, principles, levels and phases of teaching.
- (b) Concept, process, principles and barriers of communication.
- (c) Classroom Communication (Verbal and Non- Verbal).
- (d) Systematic observation of classroom interaction: FIAC- encoding and decoding procedures.



Unit-III: Models of Teaching & Instructional Strategies

- (a) Concept, elements and needs of a teaching model.
- (b) Classification of Teaching Models, Glaser's basic teaching model, Bruner's concept attainment model.
- (c) Instructional Strategies- Group discussion, Brainstorming, Tutorial and Role Playing.

Unit-IV: Innovation in Educational Technology and Modification of Teaching Behavior

- (a) CAI, Teleconferencing and Language Laboratory.
- (b) Microteaching and Simulation.
- (c) Programmed learning: psychological basis, principles and types- linear, branching and mathematics.

Assignment

Preparation of a linear or branching type of programming as instructional material in the relevant teaching subject.

Transactional Strategies

The course content will be implemented through lectures, discussions, laboratory sessions, demonstrations and multimedia presentations.

Evaluation

The course content will be of 4 credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be awarded on the basis of sessional work.

Readings

- Aian Cleary (1976), Educational Technology, Wiley & Sons, New Delhi.
- Antani, H. (1997), Internet for Beginners, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
- Bruce, Joyce and Marsha Weil (1992), Models of Teaching, Prentice Hall of India, New Delhi.



- Curtin (1998), Information Technology in the Breaking Wave, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
- Hota (1996), Communications, IGNOU, New Delhi.
- Jain, V.K. (1997), Information Technology, BPB Publication, New Delhi.
- Kumar, A and S.Goswami (1996), The Information Society, IGNOU, New Delhi.
- Leon, Mathews (1996), Internet for Everyone, Leon Teach Work Publication, Chennai.
- Oshea T. and Selt J. (1983), Learning and Teaching with Computers, The Harvest Press, Sussex.
- Rao, V.K. (2005), Instructional Technology, A.P.H. Publishing, New Delhi.
- Rojers, William (1984), Communication in Action, Rinehart and Winston, Holt.
- Sinha, P.K.(1998), Computer Fundamentals, BPB Publications, New Delhi.
- Yogendra K. Sharma (2004), Fundamental Aspect of Educational Technology, Kanishka Publishers, New Delhi.
- Pandey, K.P.(2007), A First Course in Instructional Technology, Amitash Prakashan, Delhi.
- Pandey, K.P. (2007), Technology of Programmed Instruction, Amitash Prakashan, Delhi.




SEMESTER-VI

हिन्दी

601— भाषा विज्ञान एवं हिन्दी भाषा

Credits-4

अंक विभाजन, 4 निबन्धात्मक प्रश्न — 4 X 20 = 80 अंक

4 लघुत्तरीय प्रश्न — 4 X 5 = 20 अंक

पूर्णांक—100

पाठ्य-विषय :

1. भाषा विज्ञान : सामान्य परिचय (क) भाषा विज्ञान के अंग (ख) विषय-क्षेत्र (ग) अध्ययन की पद्धतियाँ।
2. भाषा : (क) भाषा का स्वरूप (ख) भाषा की उत्पत्ति (ग) भाषा की प्रवृत्ति एवं विशेषताएँ (घ) भाषा, विभाषा और बोली।
3. ध्वनि विज्ञान : (क) हिन्दी ध्वनियों का सामान्य परिचय (ख) ध्वनि-परिवर्तन की दिशाएँ।
4. रूप विज्ञान : अर्थतत्त्व तथा सम्बन्धतत्त्व का परिचय, प्रकार और संयोग।
5. अर्थविज्ञान : सामान्य परिचय : (क) अर्थ का तात्पर्य और महत्त्व (ख) शब्द और अर्थ का सम्बन्ध (ग) अर्थ-परिवर्तन की दिशाएँ एवं कारण।
6. भारतीय आर्य भाषा परिवार : प्राचीन मध्यकालीन और आधुनिक भारतीय आर्यभाषा का सामान्य परिचय।
7. हिन्दी : (क) हिन्दी शब्द की व्युत्पत्ति, (ख) हिन्दी का क्षेत्र-विस्तार, (ग) हिन्दी भाषा का विकास (सामान्य परिचय)।
8. हिन्दी की प्रमुख बोलियाँ : खड़ी बोली, ब्रज, अवधी तथा भोजपुरी का सामान्य परिचय।
9. हिन्दी भाषा के विभिन्न रूप : राष्ट्रभाषा, राजभाषा, सम्पर्कभाषा।
10. हिन्दी-शब्द-भण्डार : तत्सम, तदभव, देशज तथा आगत शब्द।
11. देवनागरी लिपि : (क) उद्भव और विकास (ख) गुण-दोष (ग) सुधार के प्रयत्न।

सहायक ग्रंथ :

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|--|--------------------------|
| ➤ भाषा विज्ञान | — डॉ० भोलानाथ तिवारी |
| ➤ हिन्दी भाषा | — डॉ० भोलानाथ तिवारी |
| ➤ भाषा विज्ञान की भूमिका | — डॉ० देवेन्द्रनाथ शर्मा |
| ➤ भाषाशास्त्र की रूपरेखा | — डॉ० उदयनारायण तिवारी |
| ➤ हिन्दी भाषा और नागरी लिपि | — डॉ० देवेन्द्रनाथ शर्मा |
| ➤ सामान्य भाषा विज्ञान | — डॉ० बाबूराम सक्सेना |
| ➤ भाषा विज्ञान | — डॉ० कर्ण सिंह |
| ➤ भाषा विज्ञान व हिन्दी भाषा की भूमिका | — डॉ० त्रिलोचन पाण्डेय |

English Literature
601- Indian English Literature

Marks-100 Credits-4

Unit-I: Ten short answer questions based on the entire course including three passages for explanation

Unit-II: Poetry

NissimEzkiel	'A Poem of Dedication'
JayantMahapatra	'A Country'
R.N. Tagore	'Song Nos10 &11 from <i>Gitanjali</i> '
A K Ramanujan	'A River'
Keki N Daruwala	'The Unrest of Desire'

Unit-III: Drama

Mahesh Duttani	Seven Steps around the Fire
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Unit-IV: Fiction

Mulk Raj Anand	The Untouchable
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Unit-V: Prose

JawaharLal Nehru	'The Early Civilizations' from <i>Letters from a father to His Daughter</i>
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Q.No.1. Ten short answer questions based on the entire course including three passages for explanation.

Q No,2-5. One Long answer question from each unit (Unit II to V)



संस्कृत

601-काव्यशास्त्र, व्याकरण एवं निबन्ध

पूर्णांक-100 Credits- 4

इकाई (i)	– साहित्यदर्पण के आधार पर अधोलिखित का परिचय– काव्यलक्षण, काव्यप्रयोजन, शब्दशक्ति, गुण तथा रस।	40
इकाई (ii)	– लघुसिद्धान्तकौमुदी पूर्वकृदन्त, उत्तरकृदन्त	30
इकाई (iii)	– लघुसिद्धान्तकौमुदी तद्धित एवं स्त्री प्रत्यय (तद्धित में अपत्याधिकार एवं शैषिक् तथा स्त्री प्रत्यय में डीप, टाप)	20
इकाई (iv)	– संस्कृत निबन्ध	10

संस्तुत ग्रन्थ

- साहित्यदर्पण: – डॉ० निरूपण विद्यालंकार
- साहित्यदर्पण: – डॉ० शालग्राम शास्त्री
- साहित्यदर्पण: – प्रो० सत्यव्रत सिंह
- संस्कृत आलोचना – पं० बलदेव उपाध्याय
- लघुसिद्धान्तकौमुदी – पं० श्री धरानन्द शास्त्री
- संस्कृत निबन्ध मकरन्द: – डॉ० कृष्णदत्त मिश्र एवं डॉ० विजय शंकर पाण्डेय
- संस्कृत निबन्ध मंजरी – डॉ० शिवप्रसाद शर्मा



Psychology
601- Systems of Psychology

Marks-75 Credits-3

Unit-I: Development of Psychology: Contribution of Weber, Fechner, Helmholtz, Galton, William James and Cattell.

Unit-II: Structuralism: Contribution of Wundt and Titchner, Criticism of Structuralism. Functionalism: Chicago school- Contribution of John Dewy, Angell, Carr. Columbia school: Contribution of Thorndike and Woodworth. Criticism of functionalism, Difference between structuralism and functionalism.

Unit-III: Behaviourism : Watson's behaviourism - Characteristics and evaluation. Gestalt psychology: Gestalt psychology as a school, Elements of Gestalt theory- Perception, learning and thinking.

Unit-IV: Psychoanalysis: Freudian contribution- Theory of mind, Repression, Dream theory, Theory of Instinct. Stages of Psychosexual development, Defence mechanism. Adler's individual psychology, Jung's collective unconscious. Levin's Field theory, Maslow's Hierarchy of needs.

Books Recommended :

- Singh, A.K. (1991): The Comprehensive History of Psychology, Motilal Banarasi Das, Delhi.
- Wolman, B.B. (1979): Contemporary Theories and Systems in Psychology, Delhi, Freeman Book Co.
- Marx, M.H. & Hillix, W.A.C. (1989): Systems and theories in Psychology, New York: Mc raw-Hill.
- सिंह, ए.के. एवं सिंह, ए.के. (2006): मनोविज्ञान के सम्प्रदाय एवं इतिहास, मोतीलाल बनारसी दास, दिल्ली।
- शर्मा, ए.के. (2002): मनोवैज्ञानिक विचारधारायें, भार्गव बुक हाउस, आगरा।
- अजीमुर्हमान एवं अशरफ, जावेद (2004): मनोविज्ञान का संक्षिप्त इतिहास, मोतीलाल बनारसी दास, दिल्ली।



Psychology
601- Practical

Marks-50 Credits-2

(Any 8 of the following 10 practicals)

(निम्नलिखित 10 में से कोई 8 प्रायोगिक कार्य)

1. Paired-comparison method of scaling (मापन की युग्मित-तुलना विधि)
2. Rank order method of scaling (मापन की कोटि क्रम विधि)
3. Rating Scale (क्रमिक मापनी)
4. Measurement of stress (प्रतिबल का मापन)
5. Measurement of Job satisfaction (कार्य-तोष का मापन)
6. Measurement of Coping Strategies (प्रवरण युक्तियों का मापन)
7. Measurement of Aptitude (अभिक्षमता का मापन)
8. Measurement of Intelligence (बुद्धि का मापन)
9. Measurement of Achievement (उपलब्धि का मापन)
10. Measurement of Interest (रुचि का मापन)



Sociology
601- Social Research Methods

Marks-100 Credits-4

Objectives:

This course aims to provide an understanding of the nature of social Phenomena, the issues involved in social research and the ways and means of understanding and studying social reality.

Thus the emphasis is there on the study of research method as a means of understanding social reality. There are different perspectives and methods (both quantitative and qualitative research) are to be covered.

Course outline:

Unit-I: Meaning, scope and significance of social research. Conceptualization and and formulation of hypothesis.

Unit-II: scientific Study of social Phenomena. The scientific method, logic in social Science. Objectively and subjectivity in social science. Positivism and Phenomenology.

Unit-III: Methods of Research : Quantitative- Social Survey and qualitative methods, - observation, case study, content analysis.

Unit-IV: Types of Research- basic and applied, historical and empirical, Descriptive, exploratory, explanatory experimental.

Unit-V: Techniques of Data Collection:- Sampling techniques, Questionnaire, schedule and interview guide, primary and secondary data.

Unit-VI: Classification and presentation of data coding, tables, graphs, Measures of central tendency: Mean, Median, Mode, Standard Deviation.

Essential Readings:

- Bajaj and Gupta. 1972, Elements of Statistics. New Delhi: R.Chand and Co.
- Beteille, A. and T.N. Madan.1975, Encounter and experience: Personal Accounts of Fieldwork. New Delhi: Vikas Publishing House.
- Bryman, Alan. 1988 Quality and Quantity in Social Research, London: Unwin Hyman.
- Garrett, Henry. 1981 Statistics in Psychology and Education. David Mckay. Indian Publication-Mrs. A.F.Sheikh for Vakils, Bombay, Tenth Reprint.



- Jayram, N.1989. Sociology: Methods and Theory. Madras: MacMillan.
- Kothari, C.R.1989. Research Methodology: Methods and Techniques, Bangalore, Wiley Eastern.
- Punch, Keith. 1996. Introduction to Social Research, London: Sage.
- Shipmen, Martin. 1988. The Limitations of Social Research.London Sage.
- Srinivas, M.N. and A.M.Shah 1979. Fieldworker : The Field, Delhi Oxford.
- Young, P.V. 1988. Scientific Social Survey and Research. New Delhi: Prentice Hall.



Philosophy
601- Philosophy of Religion

Marks-100 Credits-4

Unit-I: Definition and Nature of Philosophy of Religion. It's Relation to 'Dharma' and Philosophy, Definition and nature of 'Dharma' and its relation to science.

Unit-II: Nature of Religious Consciousness- Origin of the Religious Consciousness- Knowledge, Emotion and Will, Basis of Religious Belief: Reason, Faith, Belief, Revelation.

Unit-III: Nature of God and attributes Various Ideas of God- Deism, Pantheism, Panentheism, Theism. Proofs for the existence of God: Ontological, Causal, Teleological and Moral proofs.

Unit-IV: Problems of Evil and its solutions. Atheism and its Kinds, Immortality of Soul and it's Importance for Religion. Thoughts of Vivekananda, Gandhi, Bhagwandas and Radhakrishnan about unity of Religions.

Suggested Reading

- John Hick : Philosophy of Religion
- D.M. Edwards : The Philosophy of Religion
- Radhakrishnan : Eastern Religion and Western Thought
- G. Galloway : The philosophy of Religion
- John Caird : An Introduction to Philosophy of Religion
- E.S. Brightman : Philosophy of Religion
- Wright : A Student's Philosophy of Religion
- हरेन्द्र प्रसाद सिन्हा : धर्म दर्शन की रूपरेखा
- बी०एन०सिंह : धर्म दर्शन
- वेद प्रकाश वर्मा : धर्म दर्शन के मूल तत्त्व
- याकूब मसीह : सामान्य धर्म दर्शन
- दुर्गादत्त पाण्डेय : धर्मदर्शन का सर्वेक्षण
- शिवभानु सिंह : धर्म दर्शन का आलोचनात्मक अध्ययन
- लक्ष्मी निधि शर्मा : धर्म दर्शन
- हृदय नारायण मिश्र धर्म दर्शन



History

601- Cultural and Economic History of India (1206-1900)

Marks-100 Credits-4

Unit-I

Bhakti movement-Causes of its emergence, main principles, prominent Saints of Bhakti movement-Kabir, Nanak, Chaitanya, Tulsi Das.

Sufism-Origin, Concept and Practices.

Society in Sultanate and Mughal India.

Unit-II

Economic policy of Allauddin Khilji.

Land Revenue system under Sher Shah and Akbar.

Mahalwari and Rayyatwari System.

Permanent Settlement of Cornwallis in Bengal.

Unit-III

Renaissance in 19th Century.

Ram Mohan Roy and Brahmo Samaj.

Dayanand Saraswati and Arya Samaj.

Ram Krishna Paramhansa and Swami Vivekanand.

Unit-IV

Mughal Industries and Foreign Trade.

East India Company's Trade from 1757 to 1833.

Zamindari System in Mughal Empire.

Development of Railways in 19th Century.

Transport in India (1556-1900).

Books Recommended

- Some Aspect of Religion and Society during the Mughal Period-R.P. Tripathi.
- Life and Condition of the people of Hindustan-K.M. Ashraf.
- Religion and Politics in 13th Century-Prof. Nizami.
- भारत का सामाजिक, सांस्कृतिक, आर्थिक इतिहास, खण्ड-I, II पुरी, चोपड़ा, दास
- भारत का सामाजिक, आर्थिक इतिहास-प्रो० अशोक कुमार श्रीवास्तव
- मध्यकालीन भारतीय संस्कृति-डॉ० लईक अहमद
- 18वीं सदी के जर्मींदार-प्रो० एस०एस०आर० रिजवी
- मध्यकालीन भारतीय संस्कृति-आशीर्वादी लाल

Political Science
601- Indian Political Thought

Marks-100 Credits-4

Unit-I

Main Features of Ancient Indian Political Thought; Manu; Kautilya; Bhishma

Unit-II

The Indian Renaissance; Raja Ram Mohan Roy; Dayanand Saraswati; Swami Vivekanand

Unit-III

Gopal Krishna Gokhale; Bal Gangadhar Tilak; Arvindo Ghosh; Mahatma Gandhi

Unit-IV

Dr. Bhimrao Ram Ji Ambedkar; Jawahar Lal Nehru; M.N. Roy; Acharya Narendra Deo; Jai Prakash Narayan

Recommended Books

- V.R. Mehta: Indian Political Thought
- V.P. Verma: Modern Indian Political Thought (हिन्दी में भी उपलब्ध)
- Donald Bishap: Thinkers of Indian Renaissance
- ओम प्रकाश गाबा: भारतीय राजनीतिक चिन्तन
- के०एल० कमल: भारतीय राजनीतिक चिन्तन



Economics

601- Economic Policy of India

Marks-100 Credits-4

Unit-I: Objectives of Macro: Economic Policy in Developed and Developing countries. Formulation of Economic Policy: the Process, Policy for Controlling Inflation and Unemployment. An overview of Population Policy in India. Policy For Poverty Eradication. Overview of New Economic Policy.

Unit-II: Industrial Policy in India: Role and Objectives of Industrial Policy Private and Public Sector, Relation of Industry, MRTP and concentration of Economic Power. Private Foreign Investment in Indian Industries and its Regulation; Multinational corporations and Industrial Growth; Policy for Small-Scale Industries; India's Industrial Policy and Regional Development

Unit-III: Agriculture Policy: Objectives and Overview of Agricultural Policy in India. Agrarian Structure and Economic Policy; Brief Overview of Community centred Approach: community Development Project and Panchayati Raj. Genesis and Evaluation of the New Agricultural Strategy. Evaluation of MGNREGA. Green Revolution. Agricultural Price Policy. Food Policy and the Public Distribution system.

Unit-IV: Trade Policy: Export Policy and Import Policy. Exchange Rate policy and Devaluation. General Overview of Policies For Foreign Capital Inflow and Multi-national Assistance.



Geography
601- Environmental Studies

Marks-75 Credits-3

Unit-I: Geography as a study of Environment, concepts & components of environment, Development of environmental studies, Approaches to environmental studies, concept of ecology and ecosystem. Man-Environment relationship, Agricultural and Industrial practices, science, technology, Society and environment.

Unit-II: The problems and causes of environmental degradation, Deforestation, soil erosion, Earthquakes and Tsunamis soil exhaustion, Desertification, Air pollution, water Pollution Noise Pollution, Disposal of solid waste, Population pressure.

Unit-III: Environmental management: Environmental education, preservation of ecological balance at local, regional and National level, Major environmental policies and programs.

Unit-IV: Sample studies - Ganga Action Plan, Tiger project, Tehri dam & Narmada Valley project.

Unit-V: Emerging environmental issues; population explosion, food security, global warming, bio-diversity and its conservation, sustainable development.

Books Recommended

- Jagdish Singh, Vatavaran Niyojan Aur Samvikas.
- P.S. Negi. Eco-Development and Environmental Geography (Hindi).
- G.P. Yadav & Ram Suresh, Paryavaran Adhyayan.
- V.K. Srivastava, Environmental and Ecology (Hindi).
- Griffith Taylor, Environmental race and migration.
- Sharma, H.S. and Chattopadhyay, S.K. Sustainable Developments concepts and issues, concept, New Delhi-2000.
- Reid, D., Sustainable Development, Earthscan, Pub. London, 1995.
- Kayastha, S.L. and Kumra, V.K. (1985) Environmental Studies, Tara Book Agency, Varanasi.



Geography
601- Practicals

Marks-50 Credits-2

(A) Field Work

Unit-I Plane table Surveying; Radiation, Inter section & Resection method, two point problem and three Point problem.

Unit-II Surveying by Prismatic Compass, open traverse. Close traverse, Elimination of error. Bowditch Method, Axis Method.

Unit-III Use of Sextant; measurement of height-accessible and inaccessible method.

OR

Indian clinometers; Measurement of height-accessible and inaccessible method.

(B) Field Study Report :

Select a village or a town or a ward of a city and prepare a report based on primary and secondary data with the help of maps and diagrams

(C) Viva-Voce & Sessional Records

Division of Marks:

(A) Field work (One exercise from each unit. Duration four hours)	10+10+5= 25Marks
(B) Field Study report	15Marks
(C) Viva-Voce & Sessional Records	10Marks

Books Recommended

- Singh, R.L., Elements of Practical Geography, Kalyani Pub. New Delhi.
- Khan, Z.A., Text book of practical Geography, Concept, New Delhi-1998.
- Sharma J.P.-Prayogik Bhugol.

601- Practical (B.Ed.)

Marks-100 Credits-4

1. Micro Teaching- at least 8 skills. **25**
सूक्ष्म शिक्षण— कम से कम 8 कौशल।
2. Action Research Project- Based on School/Class/Community Problem. **20**
क्रियात्मक अनुसंधान योजना— विद्यालय/कक्षा/सामुदायिक समस्याओं पर आधारित।
3. Use of ICT and development of power point presentation (PPT) including improvisation of teaching aids. **20**
सूचना एवं सम्प्रेषण तकनालजी का अनुप्रयोग तथा पावर प्वाइंट प्रस्तुतियों का विकास जिसमें शिक्षण उपकरणों का निर्माण भी शामिल है।
4. Personality development with emphasis on- Communication skill including language use and improvement of speech. **15**
व्यक्तित्व विकास— सम्प्रेषण कौशल (भाषा प्रयोग एवं वाक् सुधार सहित) पर बल देते हुए।
5. Internship - I (4 weeks) **20**
School visit: primary/upper primary/secondary and preparation of status report about various facilities provided in the school.
विद्यालय भ्रमण : प्राथमिक/उच्च प्राथमिक/माध्यमिक विद्यालय एवं विद्यालयों में उपलब्ध विभिन्न संसाधनों की एक रिपोर्ट तैयार करना।



SEMESTER- VII

701- Pedagogy of School Subject – 1 विषय शिक्षण-1 100 Marks 4 Credits

702 -Pedagogy of School Subject – 2 विषय शिक्षण-2 100 Marks 4Credits

Pedagogy of School Subjects – Paper Code 701 and 702

Pedagogy of two school subject have to be selected from the following groups in which only one subject is to be selected from each group:

निम्नलिखित संवर्गों में से किन्हीं दो विषयों का चयन करना है जिसमें एक संवर्ग से एक ही विषय का चयन करना है :

Group A	Group B
1. Hindi teaching हिन्दी शिक्षण	1. History teaching इतिहास शिक्षण
2. Sanskrit teaching संस्कृत शिक्षण	2. Geography teaching भूगोल शिक्षण
3. English teaching अंग्रेजी शिक्षण	3. Civics teaching नागरिक शास्त्र शिक्षण
	4. Economics teaching अर्थशास्त्र शिक्षण



Group- A

1- Hindi Teaching (हिन्दी शिक्षण)

उद्देश्य – इस प्रश्नपत्र के अध्ययन के उपरान्त विद्यार्थी :

1. शिक्षा में मातृ-भाषा शिक्षण के महत्व से अवगत हो सकेंगे।
2. हिन्दी भाषा शिक्षण के विभिन्न उद्देश्यों का निरूपण कर सकेंगे।
3. हिन्दी भाषा में उच्चारण, ध्वनि विज्ञान एवं उच्चारण संबंधी दोषों, कारणों एवं उनके निवारण से अवगत हो सकेंगे।
4. हिन्दी भाषा शिक्षण हेतु विभिन्न विधियों का उपयोग कर सकेंगे।
5. भाषा शिक्षण में दृश्य-श्रव्य साधनों का प्रभावी अनुप्रयोग कर सकेंगे।

इकाई 1अ. माध्यमिक स्तर पर उ०प्र० बोर्ड द्वारा निर्धारित पाठ्यक्रम का समीक्षात्मक अध्ययन।

ब. निर्धारित पाठ्यक्रम का भाषिक पक्ष एवं शिक्षण हेतु निहितार्थ।

इकाई 2अ. मातृभाषा शिक्षण एवं उसका महत्व, राष्ट्रीय एकता के विकास में हिन्दी की भूमिका, हिन्दी शिक्षण के उद्देश्य: ज्ञानात्मक, कौशलपरक, रसात्मक एवं सर्जनात्मक।

ब. भाषा शिक्षण एवं भाषा विज्ञान: ध्वनि विज्ञान, पद विज्ञान, वाक्य विज्ञान एवं अर्थ विज्ञान, भाषा शिक्षण एवं उच्चारण: शुद्ध उच्चारण का महत्व, उच्चारण में दोष, कारण एवं निदान।

इकाई 3 अ. हिन्दी शिक्षण की विधियाँ – गद्य शिक्षण, पद्य शिक्षण एवं व्याकरण शिक्षण के सन्दर्भ में पाठ्ययोजना : आवश्यकता, विभिन्न प्रकार, निर्माण के पद।

ब. भाषा शिक्षण में पाठ्य पुस्तकों का महत्व, उद्देश्य एवं उनके प्रकार।

इकाई 4अ. भाषा शिक्षण में दृश्य-श्रव्य साधनों की भूमिका: दृश्य उपकरण, श्रव्य उपकरण, दृश्य-श्रव्य उपकरण एवं कम्प्यूटर।

ब. हिन्दी शिक्षण एवं मूल्यांकन की नवीन प्रविधियाँ।

अध्ययन ग्रन्थ—

- गुप्त, मनोरमा : भाषा शिक्षण सिद्धान्त और प्रविधि, केन्द्रीय हिन्दी संस्थान, आगरा।
- चतुर्वेदी, सीताराम : भाषा की शिक्षा, हिन्दी साहित्य कुटीर, वाराणसी।
- तिवारी, उदयनारायण : भाषा विज्ञान।
- तिवारी, भोलानाथ : भाषा विज्ञान, किताब महल, 22ए, सरोजनी नायडू मार्ग, इलाहाबाद।
- दूबे, मीरा : हिन्दी शिक्षण।
- पाण्डेय, रामशकल : हिन्दी शिक्षण, विनोद पुस्तक मन्दिर, आगरा।
- वर्मा, रामचन्द्र : हिन्दी प्रयोग।
- चतुर्वेदी, शिखा : हिन्दी शिक्षण, आर. लाल बुक डिपो, मेरठ।

2- Sanskrit Teaching (संस्कृत शिक्षण)

उद्देश्य — इस प्रश्नपत्र के अध्ययन के उपरान्त विद्यार्थी :

1. शिक्षा में संस्कृत शिक्षण के महत्व से अवगत हो सकेंगे।
2. संस्कृत भाषा शिक्षण के विभिन्न उद्देश्यों का उल्लेख कर सकेंगे।
3. संस्कृत भाषा में उच्चारण, ध्वनि विज्ञान एवं उच्चारण संबंधी दोषों, कारणों एवं उनके निवारण से अवगत हो सकेंगे।
4. संस्कृत भाषा शिक्षण हेतु विभिन्न विधियों का उपयोग कर सकेंगे।
5. भाषा शिक्षण में दृश्य-श्रव्य साधनों का प्रयोग कर सकेंगे।

इकाई 1अ. उ0प्र0 माध्यमिक बोर्ड द्वारा निर्धारित संस्कृत विषय का पाठ्यक्रम उसका भाषिक पक्ष एवं शिक्षण हेतु निहितार्थ।

ब. संस्कृत विषय का अन्य विषयों/भाषाओं से सम्बन्ध।

इकाई 2अ. संस्कृत भाषा में उच्चारण सम्बन्धी छात्रों की कठिनाइयाँ, ध्वनि विज्ञान, उच्चारण-दोष, कारण एवं निवारण।

ब. भाषा शिक्षण में पाठ्यपुस्तकों का महत्व उद्देश्य एवं उनके प्रकार।

इकाई 3अ. संस्कृत शिक्षण में शैक्षणिक उपकरण एवं सहायक सामग्री— भाषा प्रयोगशाला, दृश्य सामग्री, दृश्य एवं श्रव्य सामग्री, कम्प्यूटर समर्थित अनुदेशन।

ब. संस्कृत शिक्षण हेतु पाठयोजना निर्माण, अर्थ, प्रकार, विभिन्न पद एवं उपयोगिता।

इकाई 4अ. संस्कृत शिक्षण की विधियाँ— गद्य के सन्दर्भ में, पद्य के सन्दर्भ में, व्याकरण के सन्दर्भ में,

ब. संस्कृत में मूल्यांकन की नवीन प्रविधियाँ।

अध्ययन ग्रन्थ—

- गुप्त, मनोरमा : भाषा शिक्षण, सिद्धान्त और प्रविधि, केन्द्रीय हिन्दी संस्थान, आगरा।
- चान्फे, बी0 एन0 : संस्कृत शिक्षण विधि।
- चौबे, विजयनारायण : संस्कृत शिक्षण विधि, हिन्दी संस्थान, लखनऊ।
- पाण्डेय, रामशकल : संस्कृत शिक्षण, विनोद पुस्तक मन्दिर, आगरा।
- तिवारी, भोलानाथ : भाषा विज्ञान, किताब महल, 22 ए, सरोजनी नायडू मार्ग, इलाहाबाद।
- द्विवेदी वाचस्पति : संस्कृत शिक्षण विधि, सुशील प्रकाशन, चौक पटना।

3- English Teaching

Objective- After Studying this paper, the student will be able to :

1. Explain the principles of language teaching.
2. Formulate the objectives of English teaching at different levels.
3. Use the appropriate method of teaching prose, poetry and grammar.
4. Make use of teaching aids appropriate for second language.
5. Prepare the lesson plan for teaching at different stages.

Unit-I-

- A. A critical study based on the survey of the english language course prescribed at the school level and the implications for pedagogy of English.
- B. Aspects of English language prescribed: English Grammar, Vocabulary and Usage.

Unit-II

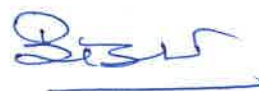
- A. Nature of English language: Some implications for organizing teaching of English as a second language, role of English language in India today, Objectives of teaching English at junior and senior stages of school.
- B. English sounds: Segmental and supra segmental phonemes in English, English morphemes: derivational and inflectional, English syntax: Basic and transformed sentences in English.

Unit-III

- A. Methods of teaching English: direct method, bilingual method: pattern practice, teaching methods for prose, poetry, grammar, reading, writing and composition.
- B. Drills and exercises in teaching of English.

Unit-IV

- A. Use of audio-visual and technological aids in teaching of English.
- B. Testing and evaluation in English as a second language.
- C. Uses of the mother tongue and teaching of translation in English.



Reference Books

- Bisht, Abha Rani, Teaching English in India, Vinod Pustak Mandir, Agra.
- Jain & Sharma, Essentials of English Teaching, RSA, International Publication, Agra.
- Nagaraj, G., English Language teaching: Approaches methods Techniques, Orient Longman, Kolkata.
- Pandey K.P. & Amita: Teaching English in India, Viswavidyalaya Prakashan, Varanasi.



Group-B

1- History Teaching

Objective- After Studying this paper, the student will be able to:

1. Understand the place, scope, need, importance and utility of History Teaching in Education.
2. Understand relationship between History and other subjects and objectives of history teaching according to different periods.
3. Critically analyze concept of curriculum, and principles underlying present curriculum of history at various stages.
4. Apply special techniques by using various methods of History Teaching.
5. Prepare lesson plans in History teaching and understand the utility of teaching materials in History teaching.
6. Design tests for continuous evaluation in History Teaching.

Unit-I

- A. A critical study of content of history prescribed at school level and its pedagogic implication.
- B. History Teaching– Concept, Scope, Need and Place of History teaching in school curriculum, Aims and Objectives of history teaching at different stages.

Unit-II

- A. Curriculum of History: concept and principles of curriculum in construction, Relationship of history with other subjects..
- B. Different method of History teaching- Story, Explanation, Project and Discussion method.

Unit-III

- A. Teaching material in History teaching and its importance, teaching chronology.
- B. Lesson planning in History Teaching: meaning, different types of lesson plans.

Unit-IV

- A. Evaluation in history, Construction of achievement test based on objective type items and determination of its reliability and validity.
- B. History class and history teacher, Excursions and Museum: its importance.



Practical Work –

1. Developing a Unit- test on any topic.
2. Essay writing on any research related to history.

Reference Books-

- Tyagi, G.S. : Teaching History, Vinod Pustak Mandir, Agra (1990).
- Kochar, S.K. : Teaching of History, Sterling Publisher, Delhi (1967).
- Singh, Y.K.: Teaching of History: Modern Methods, Ashish books, Delhi (2010).
- Ghate V.D. : History Teaching, Hariyana Academy, Chandigarh (1989).
- Vajneshwari, R.: A handbook for History Teaching, Allied Publisher, Bombay (1996).
- Choudhary K.P.: Audio visual aids in Teaching Indian History, Atma Ram and Sons, Delhi (1968).
- Sharma, R.A. : History Teaching (Hindi), International Publishing House, Meerut (2001).
- Hartwell, E.C.: The Teaching of History (History Teaching Resources), Create space Independent publishing Platform, U.K. (2013).
- Husband, C. : What is History Teaching, Open University Press, U.K. (1996)



2- Geography Teaching

Objective- After studying this paper, the student will be able to:

1. Explain the importance and objectives of Geography Teaching in school curriculum.
2. Use different methods for Geography Teaching.
3. Prepare lesson plan of Geography Teaching.
4. Use teaching aids for making Geography Teaching effective.
5. Construct test in Geography Teaching.

Unit-I

- A. A critical study of content of geography prescribed at school level and its pedagogic implication.
- B. Geography teaching: Meaning, Nature, Need and Place of Geography in curriculum.

Unit-II

- A. Aims and objectives of Geography teaching.
- B. Curriculum of Geography- Concept and Principles of curriculum construction.

Unit-III

- A. Methods of Geography Teaching – Observation method, Inductive and Deductive method, Lecture method, Excursion method, Demonstration method, Regional method, Comparative method, Project method, Sample study method, Concentric method and Problem solving method.
- B. Lesson plan for Geography Teaching: techniques, related materials and their utility.

Unit-IV

- A. Evaluation procedures for measuring achievement in Geography, construction of test, for evaluation of learning outcomes in geography based on Objective type items and determination of its reliability and validity.
- B. Geography lab, library and club.

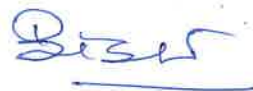


Practical Work

1. Making of a model and drawing maps related to the subject.
2. A Critical analysis of the teaching methods used in geography teaching in any two schools of Varanasi.
3. Writing an essay based on innovative practices and events related to geography.

References Books

- Arora K.L., The Teaching of Geography. R. Lal Pub. Meerut.
- Biswas Bhaskar Chandra, Learn and Teach Geography. Authors Press New Delhi.
- Cans, G.J., Handbook for Geography Teacher, London, Mathur Educational Ltd. 1957.
- Hal, Devid, Geography and the Geography Teacher, Landon, Geography Hall, 1976.
- Long and Robertson, Teaching of Geography, London, Honeman Educational Books, Ltd. 1958.
- Mesney, E.A., Teaching of Geography, London, Oxford University Press, 1952.
- Rao, M.S., Teaching of Geography, Anmol Pub. 1995.
- Singh, H.N., Geography Teaching, Vinod pustak mandir, Agra, 1985.
- Song, M.L., Handbook for Geography Teacher, London, Mathur Educational Ltd. 1974.
- Srivastava, K.M., Teaching of Geography, Sahitya Prakashan, Agra.
- Verma, J.P., Teaching of Geography, R.Lal book depot, meerut, 2012.
- Verma, O.V, Geography Teaching, Strling pub. 1991.
- Walford, R. Ed., Directions in Geography Teaching, London, longman's co. 1973.



3- Civics Teaching

Objective- After studying this paper, the student will be able to :

1. Explain the place, scope, need and importance of civics teaching in education.
2. Formulate the objectives of civics teaching according to different time periods and the correlation of civics with other subjects.
3. Critically analyze the present curriculum of civics at different levels, concept and construction of civics curriculum.
4. To use different methods of civics teaching.
5. To develop lesson plans on civics teaching and understand the importance of the content in civics teaching.
6. Construct test in civics teaching.

Unit-I

- A. A critical study of the content of civics prescribed at school level and its pedagogic implications.
- B. Teaching of Civics – Meaning, nature, need, importance and relation with other school subjects.

Unit-II

- A. Aims and Objectives of Civics teaching at the school level.
- B. Curriculum of Civics Teaching– Concept and Principles of curriculum construction.

Unit-III

- A. Methods of Civics Teaching– Lecture method, Discussion method, Source method, Project method, Brain storming method, Simulated Teaching method and Problem solving method.
- B. Format of various lesson plans: importance and construction of lesson plan for Civics Teaching.

Unit-IV

- A. Importance and application of teaching aids in Civics Teaching, Activities for civics teaching, civics room and library, civics teacher.
- B. Evaluation in Civics– Construction of achievement test based on objective type items and determination of its Reliability and Validity.

Practical Works

1. Constructing Unit- tests based on Civics curriculum at school level.
2. Writing an essay based on amendments in constitution.

Reference Books-

- Singh, Rampal : Teaching of civics, R. Lal Book Depot. Meerut (2012).
- Singh, Satnam. : Modern Methods of Teaching Political Science, Srishti Book Distributors, New- Delhi.
- Tyagi, Gurusaran: Teaching of civics, Vinod Pustak Mandir, Agra (2013).
- Yadav, Nirmal. : Teaching of Civics and Political Science.



4- Economics Teaching

Objective – After studying this paper, the student will be able to:

1. Indicate the importance and Objectives of Economics Teaching in school curriculum.
2. Use different methods of Teaching in Economics.
3. Make lesson plan of Economics Teaching.
4. Use Teaching aids for making Economics Teaching effective
5. Construct objective based objective type test items in Economics.

Unit-I

- A. Content of Economics as a school subject at a glance: Its pedagogic implications in terms of interdisciplinary approach.
- B. Economics Teaching: Nature, Scope and Place of economics teaching in school curriculum, Aims and Objectives of Economics teaching at different levels.

Unit-II

- A. Economics curriculum – Concept, Principles of Curriculum construction in economics: critical analysis of present curriculum implemented at different levels of Education, Correlation of Economics with other subjects.
- B. Methods of Economics Teaching – simulated Teaching, project method, lecture method, discussion method, brain storming and methods based on small groups.

Unit-III

- A. Teaching aids & their use in Economics teaching.
- B. Lesson planning in Economics Teaching: Meaning, types and importance.

Unit-IV

- A. Methods of evaluation in Economics Teaching, Construction of tests for evaluation on the basis of objective type items and determination of its reliability and validity.
- B. Economics library and club.



Practical Work

1. Construction of Unit- test in subject of economics at school level.
2. Essay writing on new researches and events related to economics.

Reference Books

- Agrawal, J.C.: Teaching of Economics, RSA International Publication, Agra.
- Anuja, Amrisha Kumar : Economics of Education, Authors Pub.
- Roi, B.C.: Methods of Teaching of Economics, Prakashan Kendra, Lucknow.
- Singh, Satnam: Modern Methods of Teaching Economics, Srishti Book, New Delhi.



Practical (B.Ed.)

Internship -II (16 weeks) (School Attachment) 200 Marks 8 Credits

1. Participation in school chores such as prayers, assembly, organization of co-curricular activities etc. 10Marks
विद्यालयी क्रियाकलापों यथा प्रार्थना, दैनिक सभा एवं पाठ्यक्रम सहगामी क्रियाओं के आयोजन में प्रतिभाग।
2. Practice teaching-30 lesson each subject total 60 lesson, supervised by B.Ed. faculty. 80+80= 160Marks
शिक्षण अभ्यास- बी0एड0 पर्यवेक्षकों के निर्देशन में प्रत्येक विषय से 30 पाठ कुल 60 पाठ।
3. Community work 10Marks
सामुदायिक कार्य
4. Scouting and Guiding -Under the guidance of an authorized trainer with certificate. 10 Marks
स्काउटिंग एवं गाइडिंग- प्राधिकृत प्रशिक्षक के निर्देशन में प्रमाण पत्र सहित
5. Yoga Education – Under the guidance of a formally trained yoga expert with certification from the concerned institution. 10 Marks
योग शिक्षा- औपचारिक रूप में प्रशिक्षित योग विशेषज्ञ के निर्देशन में प्रमाण पत्र सहित।



SEMESTER-VIII

हिन्दी

801— उपन्यास, कहानी, एकांकी तथा अन्य लघु गद्य विद्याएँ

Credits-4

अंक विभाजन— 3 व्याख्या —3 x 10 =30 अंक, 2 निबन्धात्मक प्रश्न— 2 x 20 = 40 अंक

5 लघु उत्तरीय प्रश्न — 5 x 6 = 30 अंक

पूर्णांक : 100

पाठ्य ग्रंथ :

1. लोक ऋण (उपन्यास) — विवेकी राय, विश्वविद्यालय प्रकाशन, चौक, वाराणसी।
2. हिन्दी कहानी— सं० डॉ० उर्मिला मिश्र, विश्वविद्यालय प्रकाशन, वाराणसी।
संकलित कहानीकार : प्रेमचन्द, जय शंकर 'प्रसाद', सच्चिदानन्द, हीरानन्द, वात्स्यायन 'अज्ञेय', मोहन राकेश, कमलेश्वर, राजेन्द्र यादव, शिवप्रसाद सिंह, निर्मल वर्मा, सूर्यबाला, ओमप्रकाश वाल्मीकि।
3. एकांकी धारा — सं० डॉ० लक्ष्मीशंकर गुप्त, अमृत प्रकाशन, वाराणसी।
संकलित एकांकीकार : रामकुमार वर्मा, भुवनेश्वर, उपेन्द्रनाथ अश्क, हरिकृष्ण प्रेमी, जगदीशचन्द्र माथुर, विष्णु प्रभाकर, भारत भूषण अग्रवाल, धर्मवीर भारती।
4. विविधा (नवीन संस्करण) — सं० डॉ० श्रद्धानन्द, अमृत प्रकाशन, वाराणसी।
संकलित विद्याएँ : रेखा चित्र (महादेवी वर्मा) रिपोर्ताज (रांगेय राघव), जीवनी (विष्णु प्रभाकर), आत्म कथा (हरिवंश राय बच्चन), संस्मरण (बनारसी दास चतुर्वेदी)। यात्रा वृत्त (सच्चिदानन्द हीरानन्द वात्स्यायन अज्ञेय)।

सहायक ग्रंथ :

- | | |
|--|-------------------|
| ➤ नयी कहानी की भूमिका | — कमलेश्वर |
| ➤ नयी कहानी : संदर्भ और प्रवृत्ति | — देवीशंकर अवस्थी |
| ➤ हिन्दी कहानी | — राजेन्द्र यादव |
| ➤ हिन्दी रेखाचित्र | — माखन लाल शर्मा |
| ➤ हिन्दी जीवनी साहित्य : स्वरूप और विकास | — भगवानदास महाजन |
| ➤ हिन्दी में आत्मकथा साहित्य | — एन०डी० वर्मा |
| ➤ हिन्दी का संस्मरण साहित्य | — के०एस० सहाय |
| ➤ हिन्दी साहित्य में आत्मकथा | — सरोज जोगी |
| ➤ यात्रा साहित्य का उद्भव और विकास | — एस०एम० माथुर |

English Literature
801- New Literatures in English

Marks-100 Credits-4

The paper has been framed to familiarize the students with the writings in English all over the world.

Unit-I: Ten short answer questions based on the entire course including three passages for explanation

Unit-II:

Australian Literature (Poetry)

W C Wentworth	'The Wild Colonial Boy'
Ada Cambridge	'An Answer'
Chris Wallace	'Melbourne'
Kevin Gilbert	'Mister Man'

Unit-III

American Literature (Drama)

Edward Albee	The Zoo Story
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Unit-IV

Canadian Literature (Fiction)

Alice Munro	'Meneseteung' from <i>Friend of my youth</i>
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Unit-V

Afro-American Literature (Prose)

Alice Walker	In Search of Our Mother's Garden
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(Only 1st essay from Part Three)

Q. No. 1. Ten short answer questions based on the entire course including three passages for explanation.

Q No. 2-5. One Long Answer Question from each unit (Unit II-V)



संस्कृत

801— भारतीय दर्शन एवं संस्कृति

पूर्णांक—100 Credits- 4

इकाई (i)	— श्रीमद्भगवद्गीता अध्याय 16 से 18)	40
इकाई (ii)	— कठोपनिषद् प्रथम अध्याय	20
इकाई (iii)	— तर्कसंग्रहः प्रत्यक्ष प्रमाणपर्यन्त	20
इकाई (iv)	— भारतीय संस्कृति वर्णाश्रम व्यवस्था एवं पुरुषार्थ	20

संस्तुत ग्रन्थ

➤ श्रीमद्भगवद्गीता	— गीता तत्त्वविवेचनी, जयदयाल गोयन्दका
➤ श्रीमद्भगवद्गीता	— डॉ० श्रीकृष्ण तिवारी
➤ कठोपनिषद्	— डॉ० आद्या प्रसाद मिश्र
➤ कठोपनिषद्	— गीता प्रेस, गोरखपुर
➤ तर्कसंग्रहः	— डॉ० आद्या प्रसाद मिश्र
➤ तर्कसंग्रहः	— प्रो० दयानन्द भार्गव
➤ भारतीय संस्कृति	— डॉ० शिवदत्त ज्ञानी
➤ भारतीय संस्कृति	— डॉ० हरेन्द्र प्रसाद सिन्हा
➤ भारतीय संस्कृति	— डॉ० शिवबालक द्विवेदी
➤ हिन्दू संस्कार	— डॉ० राजबली पाण्डेय
➤ भारत की सांस्कृतिक साधना	— डॉ० रामजी उपाध्याय

Psychology
801- Organizational Behaviour

Marks-100 Credits-4

Unit-I: Introduction: Nature and Scope, contribution of Taylor, F.W. and Elton Mayo. New challenges and opportunities. Selection and Placement: Basic selection models, measurement of individual differences. Techniques of selection: Interview and psychological testing.

Unit-II: Personnel Training and Development: Training, Methods of Training on the job and off the job. Techniques of management development. Evaluation of training programmes. Major Theories: Maslow, Adams and Vroom. Financial and non-financial incentives. Job characteristics; two models: job enrichment, quality of work life.

Unit-III: Job Satisfaction and Industrial Morale: Nature, determinants and theories, (Herzberg, Vroom). Performance Appraisal: Appraisal process, methods of performance appraisal and factors distorting performance appraisal. Organizational Stress: Nature, sources, role stress and its effect

Unit-IV: Human Engineering: Man-machine system. Designs, display, controls and action Accident and Safety: Risk taking behaviour. Accident proneness. Causes of accidents: Physical and human factors. Safety measures in industries.

Books Recommended:

- Blum, M. L. and Naylor J. C. (1968). Industrial Psychology: Its Theoretical and Social Foundations.
- Luthans, F (2005). Organizational Behaviour (10th Ed.). New York: TataMcGraw Hill.
- Rastogi, G. D. (1992). Vyavaharik Manovigyan. Agra: Har Prasad Bhargava.
- Singh, A. P. (1995). Vyavaharik Manovigyan. Varanasi: Abhishek Publications.



Sociology

801- Pioneers of Indian Sociology

Marks-100 Credits-4

Objectives

The impact of various social thoughts and philosophies is very important in The formation of Indian Society. To have a proper understanding of Indian Social system, one must be acquainted to those thoughts. India has a rich philosophical tradition. Their contributions to sociology is very remarkable In this paper the students are introduced to some of the Pioneers of Indian Sociology.

Unit I: Radha Kamel Mukerjee: Social structure of values. Social Ecology.

D.P.Mukerjee: Cultural diversities, Modernization.

Andre Betille: Social Stralification, Peasant Society and Folk Culture.

Unit II: G.S.Ghurye: Caste, Rural Urban Community.

Iravati Karve : Kinship in India.

Unit III: M.N.Srinivas: Sankritization, Secularization, and Dominant Caste.

S.C.Dubey: Indian Village, Tradition, Modernization and Development.

Unit IV: M.S.A. Rao, TK Ooman: Social Movements in India.

Yogendra Singh: Modernization of Indian Tradition,

Social change in India: Culture and resilience.

Essential readings:

- Dubey, S.C.: Society in India, New Delhi.National Book Trust.
- Dubey, S.C. : Indian Village, London Routledge (1995)
- Dubey, S.C.: India's Changing Village, London Routledge (1958)
- M.N.Srinivas: India: Social Structure New Delhi, Hindustan Publishing Corporation, 1980.
- M.N.Srinivas: Social Change in Modern India, California, Berkeley University of California University Press 1963.
- Singh,Yogendra: Modernization of Indian Tradition Delhi: Thomson Press 1973.
- Karve Irawati: Hindu Society: An interpretation. Poone. Deccan College 1961.

- G.S.Ghurye : Caste , Class and occupation, Popular Prakashan Bombay- 1950
- G.S.Ghurye: Culture and Society. Popular Prakashan Bombay-1945
- D.N.Majumdar: Races and Culture of India, Asia Publishing House, Bombay 1958.
- D.P.Mukerjee: Diversities. Peoples Publishing House, Delhi-1958
- Ooman,T.K. and R.N.Mukerjee: Indian Sociology : Reflections and Introspections, Popular Prakashan, Bombay 1986
- Andre Beteille: Essays in Comparative Sociology: Oxford University Press New Delhi.
- Andre Beteille: Society and Politics in India. Essays in Comparative Perspective: Oxford University Press: New Delhi.




Philosophy

801- Social and Political Philosophy

Marks-100 Credits-4

Unit-I: Definition nature and scope of Social Philosophy. Its relation to Sociology, Political Science and Ethics, Psychological basis of Social Philosophy.

Unit-II: Theories regarding the relation between Individual and Society (i) Individualistic Theory (ii) Idealistic Theory (iii) Organic Theory Principles regarding the origin of Society. Nature and Role of Family and Marriage in the Society as a Social institution.

Unit-III: Nature and Role of Secularism in the Society. Theories regarding the social change— Constitutionalism, Revolutionism, Terrorism and Satyagrah, Political Ideals— Idealistic Socialism and Scientific Socialism, Democracy.

Unit-IV: The Thoughts of Veda, Bhagvadgita, Gandhi, Bhagvandas & Dr Ambedkar regarding—Varna, Caste and Ashram, Tradition, Change, Modernity.

Suggested Readings

- D.D. Raphael – Problems of Political Philosophy
- J.S. Machanji– An outlines of social Philosophy
- Dr. Ramnath– Social Philosophy for the Beginners
- डॉ० अशोक कुमार वर्मा– समाज दर्शन
- डॉ० हृदय नारायण मिश्र– समाज दर्शन
- डॉ० गीतारानी अग्रवाल– धर्म शास्त्रों का समाज दर्शन
- डॉ० जगदीश सहाय श्रीवास्तव– समाज दर्शन की भूमिका
- डॉ० शिव भानु सिंह– समाजदर्शन
- डॉ० संगम लाल पाण्डेय– समाज दर्शन की एक प्रणाली
- वी०एन०सिन्हा– समाजदर्शन : सामाजिक एवं राजनैतिक



History
801- History of Modern World (1920-1947)

Marks-100 Credits-4

Unit-I:

League of Nations-Nature, Organization, Achievements and Failure

Search for Security

Problem of Disarmament

Foreign Policy of France after First World War.

Foreign Policy of Britain after First World War.

Unit-II:

Rise of Dictatorship

Italy-Fascism and Mussolini

Germany-Nazism and Hitler

Turkey-Mustafa Kamal Pasha and Regeneration of Turkey

Rise of Japan after First World War

Unit-III:

Russia after Revolution

Era of Lenin and Stalin

Great Economic Depression (1929-1932)

New Deal Policy of Roosevelt

Foreign Policy of America between two World Wars

Unit-IV:

Second World War-Causes and Result

United Nations Organization-Structure and Achievements

China-Rise of Komintang Party

Sun Yat Sen and Chiang Kai Sek

Books Recommended

- International Relation between the Two World Wars-E.H. Carr
- दो विश्वयुद्धों के बीच अन्तर्राष्ट्रीय सम्बन्ध (1919-1939)-ई० एच० कार्र
- अन्तर्राष्ट्रीय सम्बन्ध (1919-1945)-मदन गोपाल गुप्ता
- आधुनिक विश्व का इतिहास-ए०के० मित्रल



Political Science
801- International Politics

Marks-100 Credits-4

Unit-I

Meaning Nature and Scope of International Politics; Approaches to the Study of International Politics – Idealist, Realist and Systems

Unit-II

The Modern State System; Power and its Elements; National Interest; Balance of Power; Collective Security; Role of Ideology; Foreign Policy– its determinants

Unit-III

Cold War; Détente; New-Cold War; Post-Cold War International Politics; Non-Aligned Movement; Problems of the Third World

Unit-IV

New International Economic Order and New-Colonialism; Foreign Policy of U.S.A. Russia and China in the post-Second World War era; India's Foreign Policy – India and its neighboring Nation; India and ASEAN

Recommended Books

- Mahendra Kumar: Theoretical Aspects of International Politics (हिन्दी में भी उपलब्ध)
- Prakash Chandra: International Relation
- Prakash Chandra: International Politics
- पुष्पेश पंत एवं अन्य: अन्तर्राष्ट्रीय सम्बन्ध
- वी०एस० खन्ना: भारत की विदेश नीति
- आर०एस० यादव: भारत की विदेश नीति



Economics
801- Quantitative Methods

Marks-100 Credits-4

Unit-I

Algebra: Theory of numbers, Factorization, A.P., G.P. and H.P. series, Surds and indices, Identities and equations; Simple, quadratic and simultaneous. Logarithmic and exponential functions, Determinants. Matrices, basic operations, applications.

Unit-II

Calculus: Limits and functions, Derivations of functions of one and two variables, Higher order derivatives, Maxima and minima, Convexity and concavity and homogeneous functions.

Unit-III

Nature, Scope and importance of statistics for economists, Methods of data collection, Classification, Tabulation, Measures of central tendency, Arithmetic mean, Median, Mode, Measures of dispersion, Range, Mean Deviation and Standard Deviation and Coefficient of variation.

Unit-IV

Relationship between two variables and correlation coefficient. Definition index numbers and computation of simple indices. Time series, Concept and components. Agricultural statistics, Industrial statistics and population census.

Books Recommended:

- R. G. D. Allen – Mathematics for Economics
- Mehta & Madnani - Mathematics for Economics
- Taro Yamaney - Mathematics for Economics
- A. L. Nagar & R. K. Das – Basic Statistics (latest edition)
- D. N. Elhance – Fundamentals of Statistics
- डॉ. जे.पी. मिश्र – गणितीय अर्थशास्त्र
- मेहता एवं मदनानी – अर्थशास्त्र में प्रारंभिक गणित



Geography

801- Regional Studies of any one of the following Regions

Marks-100 Credits-4

(A) South West Asia

Unit-I: Region as a geographical entity and as a component of global system. Basis of regionalization/ grouping of countries - Geographical, political, historical, cultural, etc.

Unit-II: Structure Relief, climate and climatic regions, vegetation. Irrigation, Power and Mineral resources.

Unit-III: Population distribution, growth, distribution pattern, migration. Agriculture, Industries Transport and Trade.

Unit-IV: Strategic importance of the region, Suez Canal, Geographical background of the modern problems.

Unit-V: Detailed regional study of Turkey. Iraq. Israel and Saudi Arabia.

Book Recommended

- W.B. Fisher: The Middle East
- Cressey: Cross-Road
- East and Spate: Changing Map of Asia
- N.S. Ginsburg: Pattern of Asia
- W. Willcocks: The Irrigation of Mesopotamia.
- J.Jones: Turkey
- The Statesman's Year book: 2001-2002
- Vishwanath Tiwari - Asia, Ka Bhugolik Swaroop
- Mahesh Narain Nigam And B.L. Garg-Pashchimi Asia



(B) South East Asia

Unit-I: Region as a geographical entity and as a component of global system. Basis of regionalization/ grouping of countries. Geographical, political, historical, cultural etc.

Unit-II: Structure, Relief, Climate and climatic regions, vegetation. Irrigation power and Mineral resources.

Unit-III: Population - distribution, growth, distribution pattern, migration - Agriculture, industries, Trade and Transport.

Unit-IV: Strategic importance of the region, Geographical background of the modern problems.

Unit-V: Detailed regional study of Myanmar, Thailand, Malaysia and Indonesia.

Book Recommended

- Dudely Stamp : Asia
- Fisher, Charles, A : South East Asia
- Dobby : South East Asia
- Dr. Jagdish Singh - Monsoon Asia
- Dr. V.K. Srivastava - Asia
- Vishwanath Tiwari Asia Ka Bhugolik Swaroop
- Dr. M.N. Nigam & B.L. Garg - Monsoon Asia

(C) Far East Asia

Unit-I: Region as a geographical entity and as a component of global system. Basis of regionalization/ grouping of countries geographical, political, historical, cultural, etc.

Unit-II: Structure, Relief, climate and climatic regions, vegetation, Irrigation, Power and Mineral resources.

Unit-III: Population- distribution, growth, distribution pattern, migration, Agriculture, Industries, Trade and Transport.

Unit-IV: Strategic importance of the region, Geographical background of the modern problems.

Unit-V: Detailed regional study of China and Japan.

Book Recommended

- Dr. M.N. Nigam- Monsoon Ka Asia
- Vishwanath Tiwari - Asia Ka Bhaugolik Swaroop
- Trewartha ; G.T. Japan.



Pedagogy Related

801 & 802- A: Human Rights, Non-Violence & Peace Education

Marks-100 Credits-4

Objectives

The student teachers will be able to:-

1. Develop an understanding and awareness of human rights, duties and co-existence of all living beings.
2. Prepare teachers to believe that alternative and less destructive measures tend to eradicate the social evils.
3. To help them to understand the methodology of behavioral modification through training in non-violence.
4. To enable the student teacher to identify and understand the role of peace education vis-a-vis the aim of transforming the prevalent society in a peaceful state.
5. To acquaint the student teachers with the various perspectives of environmental ethics and help them to reframe their life style for a harmonious relation with nature.

Contents

Unit-I: Human Rights: Issues and Perspectives

- (a) History of the idea of Human Rights.
- (b) Political, Civil, Economic, Social and Cultural Rights.
- (c) Indian perspective of Rights and Duties.
- (d) Problem of Violation of Human Rights: some emerging issues.

Unit-II: Non-violence

- (a) Conceptual development.
- (b) Vedic, Jain, Buddhist & Gandhian Tradition.
- (c) Non-violence in Practice-Respect for all living beings, cruelty against animals, Animal Rights and Non-violence
- (d) Non-violent Resistant methods and few examples of victory without violence.



Unit-III: Training in Non-violence

- (a) Conceptual development and necessity.
- (b) Change in Heart: Training of the Mind, Change in attitude: Training in open mindedness.
- (c) Change in life style: Training in life style modification and structural change: Training for change in the system.
- (d) Conflict & conflict Management.

Unit-IV: Peace Education

- (a) Concept of Peace and Peace Education.
- (b) Development of Peace Education.
- (c) Peace Education and Disarmament Education for a new world order.
- (d) Legitimacy and limitation of Peace Education.

Assignment

Preparing a Training programme and conducting a Training of Mind/Training in open mindedness / training in life style/ Training for change in the system.

Transactional Strategies

The course content will be transacted through interactive sessions, lectures, tutorials and demonstrations.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and 20 marks will be for evaluation which shall be done on the basis of sessional work.

Readings

- Chitkara, M. G. (2003), Education and Human Values, A.P.H. Publishing Corporation, New Delhi.
- Prashad, D. (1984), Peace Education and Education for Peace, G.P.F., New Delhi.
- Doris, H. and Mullick, K. (1990), Non-violence: A Reader in the Ethics of Action, G.P.F., New Delhi.



- Jawahar, L. K. (1998), Human Rights: Issues and Perspectives, Regency Publication, New Delhi.
- Meyer, J. R. (1976), Reflections on Values Education, Wilfrid Laurier U. Press, Canada.
- M. Raja (1998), Human Rights, Soorya Pathippakalm, Tiruchirapalli.
- Talesra, H. L., N. Pancholy, and M.L. Nagda (2001), Human Rights Education (Edited), Regency Publication, New Delhi.
- Talesra, H. L. and N. Pancholy (2003), Human Rights and Education (Hindi), Ankur Publication, Udaipur.
- Venkataiah, N. (2004), Value Education, A.P.H. Publishing Corporation, New Delhi.
- White, J. P. (1990), Education and the Good Life, Kogan Page, London.




801 & 802- B: Special Education

Marks-100 Credits-4

Objectives

The student teachers will be able to:-

1. Acquaint themselves with the need and characteristics of special children.
2. Gain the knowledge about identification and prevention of special children.
3. Understand various problems of special children.
4. Know about various educational remediations to be provided for special children.

Contents

Unit-I:

- (a) Concept, Nature, types and objectives of Special Education.
- (b) Education of Mentally Retarded: Concept, Characteristics, Teaching Strategies, Remedial Programme and Prevention of Mental Retardation.
- (c) Role of various regulatory bodies in special education with particular reference to RCI.

Unit-II:

- (a) Education of the Visually Impaired: Concept, Characteristics, Prevention and Educational Programmes for Visually Impaired.
- (b) Education of the Hearing Impaired: Concept, Characteristics, Prevention and Educational Programmes for Hearing Impaired.
- (c) Education of the Orthopedically Handicapped: Concept, Types, Characteristics and Educational Programmes for Orthopedically Handicapped.

Unit-III:

Education of the Gifted and Creative Children: Concept, Characteristics and Educational Programmes. Creativity and Identification Process.

Unit-IV:

- (a) Learning Disabled Children: Concept, Characteristics, Identification and Educational Programmes.
- (b) Education for Juvenile Delinquents: Concept and Characteristics. Anti Social and Character Disorder. Educational Programmes for Rehabilitation.



Assignment

Preparing a lesson plan using role play/street play Model and implementing the same in the class of special children.

Transactional Strategies

The course content will be transacted through lectures, discussions, interactive sessions and multimedia presentations.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be for evaluation which shall be done on the basis of sessional work.

Readings

- Bhargava, M. (2004), Exceptional Children: Their Education and Rehabilitation, H.P. Bhargava Book House, Agra.
- Dash, M. K. (2008), Inclusive Education, Harprasad Institute of Behavioural Studies, Agra.
- NCERT (1987), Scheme of Integrated Education for Disabled Children, NCERT, New Delhi.
- NCTE (2004), Some Specific Issues and Concerns of Teacher Education, NCTE, New Delhi.
- Panda, K.C. (1997), Education of Exceptional Children, Vikas Publishing House, New Delhi.
- Pandey, R.S., & Advani L. (1995), Perspectives in Disability and Rehabilitation, Vikas Publishing House, New Delhi.
- Rao, V.K. (2004), Special Education, APH Publishing Corporation, New Delhi.
- Sharma, P. (1988), Teachers Handbook on IED Helping Children with Special Needs, NCERT, New Delhi.
- Sharma, R.A. (2008), Fundamentals of Special Education. R. Lall Book Depot., Meerut.
- Sharma, S. (1999), Understanding and Educating Blind, National Psychological Corporation, Agra.
- Singh U.K. (2004), Special Education, Commonwealth Publishers, New Delhi.



801 & 802 -C: Elementary Education

Marks-100 Credits-4

Objectives

The student teachers will be able to:-

1. Understand the role of Elementary and Non- Formal Education in India.
2. Develop proper understanding of various components of NPE-1986 and review of NPE- 1992 related to Elementary Education.
3. Understand the role of local bodies, state government and non-government organizations.
4. Know about various programmes related to Elementary Education.
5. Identify suitable methods of teaching For Non-Formal Education.
6. Understand the place of Non-Formal Education in the teacher training curriculum.

Contents

Unit-I:

Brief history and concept of elementary education and its Constitutional Provisions. National Policy on Education 1986 and the revised policy of 1992 with special reference to Elementary Education.

Unit-II:

- (a) Role of Panchayats, local bodies, state governments and non-governmental organizations in Elementary Education: Special qualities of an Elementary school teacher. Need for orientation and refresher courses for elementary school teacher. Role of basic training centres and DIETs in providing training to Elementary school teacher.
- (b) Programmes related to Elementary Education- MLL, ECCE, DPEP, EGS & AIE, SSA.

Unit-III:

- (a) Introduction to Non-formal Education: meaning, nature, scope and importance, difference between Non-Formal, Formal and Informal Education. Agencies of Non-Formal Education.
- (b) Functions of Non-Formal Education with special reference to all round development of rural people. Psychological and sociological bases of Non-Formal Education.

Unit-IV:

- (a) Curriculum for Elementary and Non-Formal Education.
- (b) Modern methods of teaching in Elementary and Non-Formal Education.



- (c) The place of Non-formal Education in the Teacher Training Curriculum.
Organization of Non-Formal Education.

Assignment

Visit to an elementary school and preparation of status report about various facilities provided in the school.

Transactional Strategies

The course content will be transacted through lectures, interactive sessions, group discussions and field trips.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and 20 marks will be for evaluation which shall be done on the basis of sessional work.

Readings

- Jolly K.G. (1992), Literacy for all by 2001: Strategies at District Level, D.K. Publishers, New Delhi.
- Mehta, P.L. & Poonga, R. (1997), Free and Compulsory Education, Deep & Deep Publications, New Delhi.
- Mich, Ivan (1972), Deschooling Society, Penguin, London.
- Naik, J.P. (1975), Elementary Education in India: A Promise to Keep, Allied Publishers, Bombay.
- Rajput, J.S. (1994), Universalization of Elementary Education: Role of Teacher Education, Vikas Publishing House, New Delhi.
- Rao, D. (1998), Economics of Primary Education, Rawat Publications, Jaipur.
- Rao, Digumarti Bhaskara (1997), Success Story of a Primary Education Project, APH Publishing Corporation, New Delhi.
- Reimer (1972), The school is Dead, Penguin, London.
- Report of the National Seminar on Non-Formal Education. (1980), Department of Education, South Gujarat University, Surat.
- Shah, A.B. & Bhan, S. (1980), Non-Formal Education and the NAEP, Oxford University Press, Delhi.
- Talesra, H. (1978), Non Formal Education, Himanshu Publications, New Delhi.

801 & 802- D: Educational and Vocational Guidance

Marks-100 Credits-4

Objectives

The student teachers will be able to:-

1. Understand the Importance of Guidance in school.
2. Identify the difficult areas in learning of various school subjects.
3. Understand the types of guidance.
4. Acquaint themselves with various services in Guidance.
5. Realize the importance of counseling services in school programmes and career orientations.
6. Gain knowledge about organization of guidance services in schools for children having problems in learning.

Contents

Unit-I:

- (a) Meaning, nature, principles and needs of guidance.
- (b) Objectives and functions of guidance services at Primary, Secondary and Higher education levels.

Unit-II:

- (a) Types of Guidance:-Educational, Vocational and Personal.
- (b) Concept of informatory, preparatory, placement and follow- up services.

Unit-III:

Counselling: meaning, types, methods and techniques for children with specific learning disabilities.

Unit-IV:

- (a) Anecdotal and cumulative records.
- (b) Role of guidance services in the measurement of intelligence and personality tests.
- (c) Role of guidance in school management.

Assignment

Preparing a special guidance programme for secondary students to meet out the challenges in the present day scenario.



Transactional Strategies

The course content will be implemented through lectures, discussions, interactive sessions and multimedia presentations.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and 20 marks will be for evaluation which shall be done on the basis of sessional work.

Readings

- Aggarwal, J. C. (1999), Educational and Vocational Guidance and Counselling, Doaba House, New Delhi.
- Clifford, P.F. (1958), Guidance Services in Schools, McGraw Hill Book Co. Inc., New York.
- Super, Donald B. (1962), Appraising vocational fitness, Harper and Brothers, New York.
- Erickson, Clifford E. (1947), A Basic Text for Guidance Workers, Prentice Hall Inc., New York.
- Hoose, Willian N. Van (1979), Counselling and Guidance in the 20th Century, Houghton Mifflin Co., Boston.
- Jones, A.J. (1963), Principles of Guidance and Pupil Personnel Work, McGraw Hall, New York.
- Kochhar, S.K. (1997), Educational and Vocational Guidance in Secondary Schools, Sterling publication, New Delhi.
- Peters, H.J. and Hanson, J.C. (1968), Vocational Guidance and Career Development, Macmillan, New York.
- Strang, Ruth (1933), The Role of Teacher in Personnel Work, Teacher College, Columbia University.
- Singh, R. (1994), Educational and Vocational Guidance, Commonwealth Publication, New York.
- Pandey, K.P. and Bhardwaj, Amita. (2007), Educational and Vocational Guidance in India, Vishwavidyalaya Prakashan, Varanasi.



801 & 802 E- Value Education

Marks-100 Credits- 4

Objectives

The student teachers will be able to:-

1. Understand the nature, meaning, need and sources of values.
2. Get acquainted with various bases of values.
3. Get familiar with main categories of human values.
4. Gain the knowledge of various ways and means of inculcating values among students.
5. Acquire the ability of achieving the objectives of value education at School level.

Contents

Unit-I:

- (a) Meaning, nature and need of values.
- (b) Meaning, nature, objectives, importance and scope of value education. Approaches to value education.

Unit-II:

Theoretical bases-

- i Philosophical perspective Four Purusharthas- Virtue, Wealth, Pleasure, Self-realization. Self-Realization- Panchakosha- Annamaya, Pranamaya, Manomaya, Vijnanamaya, Anandmaya.
- ii Social Cultural Basis- Family, Neighbourhood, Religion, Education, Institute, Constitution, Traditions.
- iii Psychological Basis of value development- Cognitive development approach by Lawrence Kohlberg- pre conventional, conventional and post conventional.

Unit-III:

Eight Categories of Human Values-

- i. Social Values- friendship, love, brotherhood.
- ii. Aesthetic Values- beauty.
- iii. Intellectual Values- knowledge, attainment of truth.
- iv. Ethical Values- truthfulness, Justice, benevolence, self-control.
- v. Religious Values- worship, devotion, commitment.
- vi. Health Values- Sound, Mental and Physical health, efficiency and productivity.
- vii. Recreation Values- Leisure activities that enrich the life of an individual.
- viii. Economic Values- instrumental in other values.



Unit-IV:

- (a) Ten values to be inculcated through education: Dignity of Labour, National Integration, Patriotism, Sensitivity, Gender Equality, Courtesy, Secularism, Tidiness and Scientific temper
- (b) Learning Value through various activities: Student self-government, celebration of festivals of different religions and communities, tree plantation, organizing campaigns on sanitation, nutrition etc. Participation in community development activities, service to needy, carrying out relief activities.

Assignment

1. Study of essays and articles on value concerns, autobiographies and biographies, parables, episodes from real life. Listening speeches, poems and songs. Discussion, debates and competitions for value clarification.
2. Dealing with value dilemmas: Enactment, role play, simulation, jurisprudential Model, street plays.
3. Preparing a lesson plan using role play /simulation/ jurisprudential/ street play model and implementing it.
4. Visit to community affected by a calamity and writing a report regarding relief programme based on group work.

Transactional Strategies

The course content will be transacted through interactive sessions, lectures, tutorials, demonstrations and group work.

Evaluation

The course content will be of 4 credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be awarded on the basis of sessional work.

Readings

- Damle, Y.B. (1967); 'Education and Social Values', paper presented in the conference of Indian Sociologists (October, 14-16, 1967): Indian Sociological Society, Bombay.
- Hartog Philip; 'Some aspects of Indian Education: Past and Present': Oxford University Press, London.
- Havighurst R.J. (1953); 'Human Development and Education' : Longman's Green & Company, New York.



- Jois, Justice M. Rama; 'Human Rights and Value Education': NCTE, New Delhi.
- Kabir Humayun (1961); 'Education in New India': Asia Publishing House, New Delhi.
- Meyer J.R. (1976); 'Reflections on Value Education': Wilfrid Laurier University Press, Canada.
- Mukerji R.K. (1949); 'The Social Structure of Values': Macmillan & Company, London.
- Mukerji R.K. (1964); 'The Dimension of Values, A Unified Theory': George Allen and Unwin Limited, London.
- Mukerji S.N. (1960); 'Education in India: Today and Tomorrow': Acharya Book Depot, Baroda.
- Piaget, J. (1960); 'The Moral Judgment of the Child': Free Press, New York.
- Smith H.C. (1966); 'Sensitivity to People': Mc Graw Hill Company, New York.




SEMESTER-I

PHYSICS **101- Mechanics and Relativity**

Credits-2

Mechanics

Inertial and non-inertial frames of reference, Effect of centrifugal and Coriolis forces due to earth's rotation, Center of mass (C.M), Lab and C.M frame of reference, motion of CM of system of particles subject to external forces, elastic, and inelastic collisions in one and two dimensions, Central force, Two body central force problem, reduced mass, Law of gravitation, Kepler's law, motion of planets and satellites, geostationary satellites.

Relativity

Postulates of special theory of relativity, Derivation of Lorentz transformation and physical significance of Lorentz invariance, Length contraction and time dilation, Concept of simultaneity, Relativistic velocity transformation relations, mass energy relation, Concept of zero rest mass of photon, Relativistic relation between energy and momentum.

102- Mechanical Properties of Matter

Credits- 2

Modulus of rigidity, Poisson's ratio, relation connecting different elastic- constants, twisting couple of a cylinder (solid and hollow), Dynamical method (Maxwell's needle) for determining the modulus of rigidity, Bending moment, Cantilever (neglecting mass), Young modulus by bending of beam, Viscosity, Poiseuille's equation of liquid flow through a narrow tube, Simple Harmonic motion, differential equation of SHM and its solution, damped and forced vibrations, Differential equation of wave motion, Superposition of waves, reflection of waves, phase and group velocities.

Recommended Books

- 1- Physics Part-1 : Resnick and Halliday
- 2- Mechanics : D.S. Mathur.
- 3- Concept in Physics Vol. I : H.C. Verma
- 4- Mechanics : R.K. Shukla and Anchal Srivastava



Practical for Semester-I

Credits-2

1. Determination of Stefan's constant.
 2. PN junction diode and Zener diode characteristics.
 3. Determination of Young's modulus, modulus of rigidity and Poisson's ratio of material of a wire using Searle's method.
 4. Determination of absolute capacity of a condenser.
 5. Determination of Young's modulus of material of a metallic bar by bending of beam Method.
 6. To study series and parallel resonant L. C. R. circuit.
 7. Determination of acceleration due to gravity using compound pendulum.
 8. Determination of focal length of combination of lenses and nodal distance using nodal slide assembly.
 9. Solar cell experiment.
- In Semester-I, half of the students will do the experiments of Group-I and the other half will do the experiments of Group-II. In Semester II, the students will exchange their groups. Addition and deletion in the list of experiments may be made from time to time by the department.



CHEMISTRY
101- Structure and Bonding

Credits- 2

- 1 **Atomic Structure:** Schrodinger wave equation; H atom; Radial and angular wave functions: quantum numbers and concept of orbitals; S later orbitals.
- 2 **Chemical Bonding:** VB and MO approach of H₂ molecule; MO treatment of homonuclear and heteronuclear (CO & NO) diatomic molecules; Concept of HOMO and LUMO. VSEPR theory; Structure of simple molecules and ions of main group elements.
- 3 **Ionic Solids:** Close packing, Radius ratio rule and crystal coordination number. Examples of MX and MX₂ type ionic solids (NaCl and TiO₂).
- 4 **Metallic Bonding:** theories of bonding in metals; Free electron, VB and Band theories.
- 5 **Weak Interactions:** Hydrogen bonding and Vander Waal's interactions.

102-Organic Chemistry

Credits- 2

1. **Concepts:** Inductive, resonance and steric effects hyperconjugation and their influence on acidity and basicity of organic compounds.
2. **Hydrocarbons:** Alkanes: Chlorination of methane, Alkenes: Addition reactions (Electrophilic and Free radical), Hydration, hydroxylation, hydroboration, epoxidation and ozonolysis. Alkynes: Reduction, Electrophilic addition, acidity and metal acetylides. Conjugated and isolated Dienes: 1,2- verses 1,4-addition. Diels - Alder reaction.
3. **Alkyl Halides:** Nucleophilic substitution: SN₁, SN₂ mechanisms; Eliminations reactions: E₁ and E₂ mechanisms, Elimination versus substitution reactions; energy profile diagrams-transition states (general considerations). Grignard reagents: Preparation and synthetic applications.
4. **Alicyclic Compounds:** Cycloalkanes, general synthesis, Bayer's strain Theory. Cyclohexane chair and boat conformations, axial and equatorial bonds, conformation of mono substituted cyclohexanes.



5. **Reactive intermediates and related Rearrangement reactions:** Generation, stability and reactivity of *Free radicals* (Anti Markovnikov's, Birch Reduction, Bouveault-Blanc reduction, oxidation of phenol by metal ions); *Carbocations* (Pinacol-Pinacolone, Wagner-Meerwein Rearrangement, Baeyer-Villiger oxidation, Hydroperoxide reaction and Beckmann.) and *Carbanions* (Robinson Anuulation and Michael Addition); *Carbenes* and *Nitrenes* (Hofmann, Curtius reactions). Ylides: Sulphur ylides, phosphorous ylides, Michaelis-Arbuzov phosphonate synthesis, Witting reactions, Mitsunobu reaction.

Practical for Semester-I

Credits- 2

1. Qualitative Inorganic Mixture Analysis: Not containing more than four ions and one interfering anion.
2. Qualitative Organic Analysis: Identification of simple organic compounds (derivatives not included).

Books Recommended

1. *Basic Inorganic Chemistry*, F.A. Cotton, G. Wilkinson and Paul L. Gaus, 3rd Edition (1995), John Wiley & Sons, New York.
2. *Concise Inorganic Chemistry*, J.D. Lee, 5th Edition (1996), Chapman & Hall, London.
3. *Organic Chemistry*, Paula Y. Bruice, 2nd Edition, Prentice- Hall, International Edition (1998).
4. *Organic Chemistry*, I.L. Finar, Vol. I, 6th Edition (1973), ELBS and Longman Ltd. New Delhi.
5. *Organic Chemistry*, R.T. Morrison and R.N. Boyd, 6th Edition (1992), Prentice-Hall of India (P) Ltd., New Delhi.
6. *Organic Chemistry*, J. Clayden, N. Greeves, S. Warren & E. Wothers, Oxford Univ. Press, Oxford (2001).



MATHEMATICS

101- Matrix Algebra

Credits: 2

Matrix algebra: Introduction, Elementary operations of matrices. Inverse of a matrix. Rank of a matrix Application of matrices to the system of linear equations, consistency of the system.

102-Differential Calculus

Credits: 2

Differential Calculus: Successive differentiation and Leibnitz theorem. Limit (ϵ - δ definition), Continuity, Discontinuity, properties of continuous functions. Differentiability, Chain rule of differentiation, Mean value theorems, Taylor's and Maclaurin theorems. Application of differential calculus in curve sketching.

103-Integral Calculus

Credits: 2

Integral Calculus: Definite Integral as the limit of sum. Reduction formulae for trigonometric functions, irrational, algebraic and transcendental functions. Areas of curves, rectifications, volumes and surfaces of solids of revolutions.

Recommended Books

1. D.T. Finlbeiner, Introduction to Matrices and Linear transformations, CBS Publishers, New Delhi, 1986.
2. K.B. Datta, Matrix and Linear Algebra, PHI Pvt. Ltd. New Delhi, 2000.
3. P.B. Bhattacharya, S.K. Jain, S.R. Nagpal, First Course in Linear Algebra, Wiley Eastern Ltd. New Delhi, 1983.
4. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd. Allahabad, 2000.
5. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd. Allahabad, 2010.
6. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar Inc. New York, 1975.
7. Shanti Nagayan, Elements of Real Analysis, S. Chand & Company, New Delhi.



ZOOLOGY
101- Systematics and Animal Diversity

Credits: 2

1. Systematics

1.1. Definition of taxonomy and relationship with systematic

1.2. Zoological nomenclature

1.2.1. Binominal

1.2.2. Trinominal

1.3. Kinds of taxonomic characters

1.3.1. Morphological

1.3.2. Embryological

1.3.3. Cytogenetical

1.3.4. Biochemical

1.3.5. Numerical

1.4. Kinds of Zoological Classification

1.4.1. Components of classification

1.4.2. Linnaean hierarchy

1.5. Concepts of species

1.5.1. Typological

1.5.2. Nominalistic

1.5.3. Biological

1.5.4. Evolutionary

2. *Animal Diversity*

2.1. Criteria for classification of multicellular animals

2.1.1. Symmetry

2.1.2. Body cavities : acoelomates, pseudocoelomates, coelomates (schizo and enterocoelomates)

2.1.3. Homology and analogy

2.2. Non-Chordates: General characters and classification of the following up to classes with example showing distinctive/adaptive features

2.2.1. Protozoans

2.2.2. Poriferans

2.2.3. Cnidarians

2.2.4. Ctenophorans

2.2.5. Platyhelminthes

2.2.6. Nematodes

2.2.7. Annelids

2.2.8. Arthropods

2.2.9. Molluscs

2.2.10. Echinoderms



2.3. Hemichordates: General characters and classification up to sub-classes

2.4. Chordates: General characters and classification of the following up to sub-classes with examples

2.4.1. Protochordates: Urochordates, Cephalochordates

2.4.2. Cyclostomes

2.4.3. Fishes

2.4.4. Amphibians

2.4.5. Reptiles

2.4.6. Birds

2.4.7. Mammals

102-Animal Form and Function

Credits: 2

1. Nutrition & Digestion

1.1. Intracellular and extracellular digestion: food vacuole and gastrovascular cavity.

1.2. Feeding mechanisms: suspension, deposit, cropping & sucking (herbivorous) and raptorial (carnivorous).

2. Gas exchange and internal transport

2.1. Structure and function of gills

2.2. Structure and functions of trachea, book lungs and vertebrate lungs

2.3. Respiratory pigments and transport of gases

2.4. Types of circulatory systems

3. Types of excretory organs in non-chordates and chordates

3.1. Open tubular: metanephridia

3.2. Closed saccular: Protonephridia, Malpighian tubules and kidney

4. Nervous system

4.1. Patterns of nervous system in non-chordates

4.2. Organization of nervous system in vertebrates: central and autonomous nervous system

5. Reproduction : Asexual and sexual reproduction



Recommended Books

1. Dalela & Sharma: Animal Taxonomy and Museology (1976, Jai Prakash Nath).
2. Kapoor: Theory and Practicals of Animal Taxonomy (1988, Oxford & IBH).
3. Simpson: Principles of Animal Taxonomy (1962, Oxford).
4. Roymahoney: Laboratory Techniques in Zoology (1966, Butterworths).
5. Mayer & Ashlock: Principles of Systematic Zoology (1991, McGraw Hill).
6. Boolotian & Stiles: College Zoology (10th ed. 1981, Mccmillan).
7. Campbell & Reece: Biology (7th ed. 2005, Pearson).
8. Dorit, Walker & Barnes: Zoology (1991, Saunders).
9. Taylor, Green & Stout: Biological Sciences (3rd ed. 2005, Cambridge).
10. Mader : Biology (9th e.d 2007, W.C. Brown).
11. Marshall & Williams: Textbook of Zoology, Vol. I (Parker & Haswell, 7th ed. 1972, Macmillan).
12. Miller & Harley: Zoology (6th ed. 2005, W.C. Brown).
13. Nigam: Biology of Non-chordates (1997, S. Chand).
14. Nigam: Biology of chordates (1997, S. Chand).
15. Parker & Haswell: Text Book of Zoology, Vol. II (2005, Macmillan).
16. Purves et al: Life-the Science of Biology, (7th ed. 2004, Sinauer).
17. Starr: Biology, Concepts and Applications, (1991 Wadsworth).
18. Tortora & Anagnostakos: Principles of Anatomy and Physiology (6th ed. 1986, Harper & Row).
19. Villee, Walker & Baranes: General Zoology (5th ed. 1979, Saunders).
20. Wolfe: Biology-the Foundations (1987, Wadsworth).
21. Schmidt N.: Animal Physiology (5th ed. 2005, Cambridge).
22. Hoar: General and Comparative physiology (7th ed. 2005), Indian reprint.
23. Arms and Camp: Biology (4th ed. 1995).



**Practical for Semester-I
Laboratory Exercises**

Credits: 2

Systematics and Animal Diversity & Animal Form and Function

Part A: Systematics and Animal Diversity

1. Identification of certain locally available fishes on the basis of their morphological characters.
2. Identification of the following species of *Drosophila* on the basis of their Sex-combs.: *D. melanogaster*, *D. ananassae*, *D. bipectinata* and *D. malerkotliana*.
3. Zoological names of some common animals.
4. Cold anesthesia in fish.
5. Narcotization of leech/earthworm and pond snail.
6. Preservation of insects.
7. Fixation of fresh water Protozoans.
8. Study of transverse sections/chart of the following:
Sycon (as an example of Parazoote to show its structure, spicules and canal system), *Hydra* (as an example of diploblastic animal), *Fasciola* (as an example of triploblastic acoelomate animal), *Ascaris* (as an example of triploblastic pseudocoelomate animal), *Hirudinaria* (as an example of triploblastic schizocoelomate animal), Frog (as an example of triploblastic enterocoelomate animal) – by charts.
9. Study of salient features and classification up to classes of the following non-chordates with special emphasis on their adaptive characters:
Amoeba, *Euglena*, *Plasmodium*, *Paramecium*, *Euplectella*, *Physalia*, *Corallium*, *Sea-Anemone*, *Hormiphora*, *Taenia*, *Ascaris* (Male and Female), *Nereis* (including heteronereid stage), *Hirudinaria*, *Bonellia*, *Chiton*, *Mytilus*, *Octopus*, *Peripatus*, *Limulus*, *Eupagurus*, *Sacculina*, *Asterias*, *Echinus*, *Holothuria*, *Ophiothrix*, *Antedon*.
10. Salient features and classification up to Orders of the following with special emphasis on their adaptive characters:
Balanoglossus, *Herdmania*, *Amphioxus*, *Lamprey*, *Trygon*, *Chimaera*, Lung Fish, *Uraeotyphlus*, *Ambystoma*, *Alytes*, *Hyla*, *Chameleon*, Tortoise, poisonous and non-poisonous snakes, Duck, Kiwi, Duck-billed Platypus.



Part B: Animal Form and Function

1. Animal nutrition

- 1.1. Study and mounting of cephalic appendages of *Palaeomon*
- 1.2. Study and mounting of salivary glands of *Periplaneta Americana*
- 1.3. Dissection of digestive system of *Palaemon* and mounting of Hastate Plate.
- 1.4. Dissection of digestive system of *Mystus*
- 1.5. Demonstration of internal anatomy of *Pila*

2. Gas exchange and internal transport

- 2.1. Mounting of heart and trachea of *Periplaneta americana*
- 2.2. Dissection of afferent and efferent branchial arteries of *Mystus*

3. Nervous system, receptors and sense organs

- 3.1. Dissection of nervous system of *Palaemon*
- 3.2. Mounting of statocyst of *Palaeomon*
- 3.3. Dissection of 5th, 7th, 9th and 10th cranial nerves of *Mystus*

4. Reproduction

- 4.1. Permanent preparation of gemmules of sponges
- 4.2. Study of the following through permanent slides/museum specimens:
Conjugation in *Paramecium*, Miracidium of *Fasciola* with developing Redia, Cercaria and Metacercaria larvae, Trochophore larva, Nauplius and Zoa larvae, Bipinnaria, Auricularia and Pluteus larvae, Tornaria, Ammocoetes and Tadpole (frog); Axolotl



BOTANY
101- Cryptogams-I

Credits: 2

General classification of Cryptogams; study of structure, reproduction and life history of the following representative forms included in various groups.

1. Main characteristics of Chlorophyceae, Xanthophyceae, Phaeophyceae, Rhodophyceae and Cyanophyceae.
2. Chlorophyceae: *Volvox*, *Oedogonium*.
3. Xanthophyceae: *Vaucheria*.
4. Phaeophyceae: *Ectocarpus*, *Sargassum*.
5. Rhodophyceae: *Polysiphonia*.
6. Cyanophyceae: *Nostoc*, *Scytonema*.
7. General characteristics of Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina.
8. Mastigomycotina: *Saprolegnia*, *Albugo*.

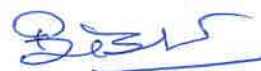
102-Cryptogams-II

Credits: 2

1. General Features and Classifications of Fungi.
2. Life history of following fungi with reference to:
 - i. Zygomycotina: *Rhizopus*.
 - ii. Ascomycotina: *Peziza*.
 - iii. Basidiomycotina: *Agaricus*, *Puccinia*.
 - iv. Deuteromycotina: *Alternaria*, *Cercospora*.

Practical for Semester-I
Practicals Based on Course - 101 and 102

Credits: 2



Recommended Books

1. Dutta, A.C. (2016). Botany for Degree Students, Oxford University Press.
2. Kumar, H.D. (1999). Introductory Phycology, Delhi: Affiliated East-West Press Pvt. Ltd.
3. Pandey, B. P.(2001). College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta, New Delhi: S. Chand & Company Ltd.
4. Sambamurthy, A. V. S. S. (2006). A Textbook of Algae, New Delhi: I. K. International Pvt. Ltd.
5. Thakur, A. K. & S. K. Bassi. (2008). A Textbook of Botany: Diversity of Microbes and Cryptogams, New Delhi: S. Chand & Company Ltd.,
6. Vashishta, B. R., Sinha, A. K.& Singh, V. P.(2008). Botany for Degree Students: Algae, New Delhi:S. Chand& Company Ltd.
7. Watson, E. V. (1974). The structure and life of Bryophytes, New Delhi:B. I. Publications.
8. Pandey D.C., Algae, C. Book D. Allahabad.



STATISTICS

101- Statistical Methods

Credits: 2

Types of data: Discrete and continuous data, Frequency and non-frequency data, Different types of scales, Primary data (designing a questionnaire and schedule), Secondary data (major sources including some government publication).

Construction of tables (with one or more factors), diagrammatic and graphical representation of grouped data, frequency and cumulative frequency distribution and their applications, histogram, frequency polygon, ogives, stem and leaf charts, box plot.

Concept of central tendency and its measures, partition values, dispersion and relative dispersion, moments, sheppard's correction for moments (without derivation), skewness, kurtosis and their measures.

102-Probability

Credits: 2

Random experiment: Trial, sample point, sample space, definitions of equally likely, mutually exclusive and exhaustive events, definition of probability, classical and relative frequency approach to probability, axiomatic approach to probability and its properties, merits and demerits of these approaches, total and compound probability, conditional probability theorems, independence of events, Bayes theorem and its applications.

Random Variable: Concept of discrete random variable, probability mass function and distribution function, joint probability mass function of several discrete random variables, marginal and conditional probability mass functions.

Continuous random variable: Probability density function, distribution function, joint density function of two continuous variables, marginal and conditional probability density functions.



Recommended Books

1. Bhat B.R., Srivenkataramana T. & Rao Madhava K.S. (1996): Statistics, A Beginner's Text, Vol. I and II, New Age International (P) Ltd.
2. Snedecors G.W. and Cochran W.G. (1967): Statistical Methods, Iowa State University Press.
3. Mood A.M., Greybill F.A. and Bose D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.
4. Spiegel M.R. (1967): Theory and problem of Statistics, Schaum's Publishing Series.
5. Goon A.M., Gupta M.K. and Das Gupta B. (1991): Fundamental of Statistics, Vol. I, World Press, Calcutta.
6. Meyer P.L. (1970): Introductory Probability and Statistical Applications, Addison Wesley.
7. Parzen E. (1960): Modern Probability Theory and its Applications, Wiley Eastern. Publishing Co.
8. Hogg R.V. and Craig A.T. (1972): Introduction to Mathematical Statistics, Amerind Publishing Co.
9. Hoel P.G. (1971): Introduction to Mathematical Statistics, Asia Publication.
10. Rohtagi V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley and Sons.
11. Croxton F.E., Cowden, D.J. and Karlin S. (1973): Applied General Statistics.

Practical for Semester-I Practicals Based on Course- 101 & 102

Credits: 2

Basic ideas of functioning of Windows and data entry in MS Excel will be given to the students. Students will be required to do practical, listed below (based on the contents of the theory paper STB – 101), using MS Excel:

1. Presentation of data by frequency tables, diagrams and graphs.
2. Measures of central tendency, partition values,
3. Measures of dispersion, relative measure of dispersion.
4. Moments, measures of skewness and kurtosis.
5. Evaluation of probability: using addition and multiplication theorems, conditional probabilities and Bayes theorem.



Pedagogy Related
101: Philosophical Dimensions and Challenges of Education

Marks: 100 Credits: 4

Objectives

The student teacher will be able to:-

1. Understand the development of Indian Education in different periods of time.
2. Appreciate the problems of Indian education.
3. Spell out the importance and role of education in the progress of Indian society.
4. Give meaning to the divergent philosophies behind education.

Contents

Unit-I: Concept of Education

- a) Education: Meaning, Nature and Scope of Education.
- b) Functions of Education in the context of Individual, Social and National level.
- c) Agencies of Education: school, community and family.
- d) Four Pillars of learning in the 21st century context.

Unit- II: Philosophical Dimensions of Education

- (a) Philosophy and Education: Significance of studying philosophy in understanding educational practices and problems. Relationship between philosophy and education.
- (b) Major Philosophical thoughts: Idealism, Naturalism and Pragmatism with their educational implications.
- (c) Educational thinkers and their contribution in developing principles of education- Mahatma Gandhi, Tagore, Aurobindo, Vivekanand and J. Krishnamurti.

Unit-III: Development of Indian Education System

- (a) Vedic system of Education, Buddhist and Medieval system of education.
- (b) Major committees and commissions in Pre-Independence period- Wood's Dispatch, Hunter commission and Sadler commission.
- (c) Major commissions and policies in Post-Independence period- University Education Commission, Secondary Education and National Education Commission, NPE-1986 and Revised NPE-1992.
- (d) Constitutional commitments for education: Fundamental rights & duties.



Unit-IV: Current Problems in Indian Education

- (a) Elementary Education and its major problems: Universalization of Elementary Education, Wastage and Stagnation.
- (b) Secondary Education and its major problems: Vocationalization, examination reform and its universalization.
- (c) Higher Education and its major problems: Privatization and Autonomy.
- (d) Problems of Teacher Education,
- (e) Role and Functions of NCTE, NCERT, NIOS, UGC and IGNOU.

Assignment

The pupil-teacher is expected to conduct a study on school- community relationship and submit a report.

Transactional Strategies

Transaction of the course content will be through lectures, discussions, multimedia presentations and interactive sessions.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and 20 marks will be for evaluation which shall be done on the basis of sessional work.

Readings

1. Anand, C.L. (1993). The Teacher Education in Emerging Indian Society, NCERT, New Delhi.
2. Bokil, V.P. (1970), Foundation of Education, Modern Book Stall, Pune.
3. Broudy, Harry. S (1961). Building a Philosophy of Education, Prentice Hall of India, New Delhi.
4. Ghanta, R. and Dash, B.N. (2005), Foundations of Education, Neel Kamal Publications, Hyderabad.
5. Humayun, K. (1957), Indian Philosophy of Education, George G. Harper & Co., New Delhi.
6. Mishra, B.K. and Mohanty, R.K. (2003), Trends and Issues in Indian Education, Surya Publication, Meerut.



7. Nayak B.K. (1997), Education in Emerging Indian Society, Taratarini Publications, Berhampur.
8. Saraswati, T.S. (1999), Culture, Socialization and Human Development, Sage Publication, New Delhi.
9. Taneja, V.R. (1998), Education Thoughts and Practice, Delhi University Publications, New Delhi.
10. Young Pai and Joseph (1964), Philosophical Problems of Education, J.P. Hippin Co., New York.
11. Pandey, K.P. (2010), Perspectives in Social Foundations of Education, Sipra Publication, New Delhi.
12. Learning the Treasure Within, Jacques Delors Report, 1996.



SEMESTER – II

PHYSICS 201-Thermal Physics –I

Credits: 2

Kinetic Theory

Maxwell's speed distribution, Mean free path, Elementary treatment of transport phenomena, Viscous flow and Thermal conduction in gases.

Real gases, Andrew's curves, Equation of state, Virial coefficients, Van der Waals equation, Critical constants.

Thermodynamics

Reversible and irreversible processes, Examples of thermal, mechanical and chemical irreversibility, Carnot's cycle and Carnot's theorem. Second law of thermodynamics, Thermodynamic scale of temperature.

Concept of entropy, Entropy change in reversible and irreversible processes. Entropy and disorder, Principle of increase of entropy, Entropy and unavailable energy, Entropy of ideal gases, Entropy as a thermodynamic variable, S-T diagram.

Thermodynamic functions, Internal energy, Enthalpy, Helmholtz function and Gibbs's free energy, Maxwell's thermodynamical equations and their applications, TdS equations, Energy and heat capacity equations

202- Thermal Physics-II

Credits: 2

Clapeyron equations, Application to sublimation, vaporization and freezing processes, Heat capacity of saturated vapours, Thermodynamics of liquid surfaces and paramagnetic solids. Adiabatic demagnetization, Third law of thermodynamics, Nernst heat theorem.

Criterion of equilibrium of a system, Isolated system, System in contact with constant temperature reservoir. System in contact with constant temperature and pressure reservoir, Phase transition, Coexistence of phases, Triple point.

Joule-Thomson effect, Thermodynamic analysis, Inversion temperature, Thermodynamic equations for a Van der Waals gas. Liquefaction of gases. Regenerative principle, Properties of liquid helium, Introduction to superfluidity and superconductivity.



Radiation

The blackbody spectrum, Wien's displacement law, Rayleigh-Jean's law, Planck's quantum theory of radiation.

Recommended Books

- 1- Heat and Thermodynamics : K.W. Zeemansky.
- 2- Thermal Physics : B.K. Agrawal.
- 3- Heat and Thermodynamics : Brij Lal and N. Subramanyam.
- 4- Heat and Thermodynamics : Dayal, Varma and Pandey.
- 5- A Treatise on Heat : M.N. Saha and B.N. Srivastava.

Practical for Semester-II

Credits: 2

1. Determination of internal resistance of micro ammeter and conversion of micro ammeter into voltmeter, milliammeter and Ohmmeter.
2. Determination of modulus of rigidity using Bortron's apparatus.
3. Construction of two-input 'OR' and 'AND' gates using diode logic and preparation of their truth tables.
4. Determination of viscosity of liquid using Poiseuille's method.
5. To study variation of magnetic field along the axis of Helmholtz Galvanometer and to determine reduction factor.
6. Determination of resistance per unit length and an unknown resistance using C. F. Bridge.
7. Determination of dispersive power of material of a prism.
8. Determination of temperature coefficient of resistance of material of a given coil.
9. Determination of thermal conductivity of a card-board by Lee's disc method.



CHEMISTRY
201-Inorganic Chemistry-I

Credits: 2

1. **Periodic trends and properties:** Size, Ionization Energy, Electron Affinity, Electronegativity, Lattice and Hydration Energies, Use of redox potential and reaction feasibility.
2. **Chemistry of s and p-block elements:** Alkali and alkaline earth metals: Hydrides and Complexation tendencies. Structural features of hydrides, halides, oxides and oxyacids.
3. **Chemistry of First Transition Series:** Salient features, characteristic properties of 3d- elements with reference to oxidation states, colour, magnetic behaviour and complex formation tendency.
4. **Chemistry of Second and Third Transition Series:** A general comparative treatment of 4d and 5d elements with their 3d analogues in respect of ionic radii, oxidation states, magnetic behaviour and electronic spectral properties.

202- Physical Chemistry-I

Credits: 2

1. **Gaseous State:** Kinetic theory of gases, ideal gas laws based on kinetic theory. Collision in a gas- mean free path, collision diameter, collision number. Behaviour of real gases - the van der Waal's equation. Critical phenomena - critical constants of a gas and their determination, the van der Waals equation and critical state, Principle of corresponding states.
2. **Liquid State:** Surface tension of liquids- capillary action, experimental determination of surface tension, temperature effect on surface tension. Viscosity of liquids, experimental determination of viscosity coefficient, its variation with temperature.
3. **Thermodynamics:** First Law of thermodynamics and internal energy, state and state functions, sign convention for heat and work, nature of work, path dependence of heat and work. Enthalpy, heat changes at constant volume and constant pressure, heat capacities (CV, CP) and their relationship for ideal gases.



Thermodynamic quantities (w , q , ΔU , ΔH) for isothermal and adiabatic reversible expansion of ideal gases and their comparison.

Change in internal energy (ΔU) and enthalpy (ΔH) of chemical reactions, relation between ΔU and ΔH , variation of heat of reaction with temperature (Kirchhoff's equation).

4. **Electrochemistry:** Arrhenius theory of electrolytic dissociation, Hydrolysis of salts, hydrolysis constant, buffer solutions, indicators and theory of acid-base indicators. Migration of ions: transference number and its determination by Hittorf methods. Conductance of electrolyte solutions, molar conductance of electrolyte and its splitting into ionic molar conductance, Kohlrausch law of independent migration of ions, ionic mobility. Application of conductance measurements: determination of degree of dissociation and dissociation constant of weak electrolytes/acids, solubility of sparingly soluble salts, and Conductometric titrations.

Practical for Semester-II

Credits: 2

Quantitative Analysis (Physical and Volumetric)

1. Determination of water equivalent of a calorimeter (cooling curve).
2. Heat of neutralization (strong acid strong base).
3. Heat of dissociation of weak acid.
4. Heat of solution (NH_4NO_3 , CaCl_2).
5. Basicity of an acid by thermochemical method.

Recommended Books

For Section-A

1. *Basic Inorganic Chemistry*, F. A. Cotton, G. Wilkinson and Paul L. Gaus, 3rd Edition (1995), John Wiley & Sons, New York.
2. *Concise Inorganic Chemistry*, J.D. Lee, 5th Edition (1996), Chapman & Hall, London.



For Section-B

1. *Physical Chemistry*, P. Atkins & J. De. Paul, 8th Edition (2006), International Student Edition, Oxford University Press, Oxford.
2. *Physical Chemistry*, P. C. Rakshit, 5th Edition (1988) 4th Reprint (1997), Sarat Book House, Calcutta.
3. *Principles of Physical Chemistry*, B. R. Puri, L. R. Sharma & M. S. Pathania, 37th Edition (1998), Shoban Lal Nagin Chand & Co., Jalandhar.
4. *Physical Chemistry*, K. J. Laidler & J. M. Meiser, 3rd Edition, Houghton Mifflin Comp., New York, International Edition (1999).



MATHEMATICS

201-Statics & Dynamics

Credits: 2

Statics: Analytic condition of equilibrium for coplanar forces. Equation of the resultant force. Virtual work.

Dynamics: Rotation of a vector in a plane. Velocity and acceleration components in Cartesian, polar and intrinsic systems. Central orbit, Kepler's laws of motion; rectilinear simple harmonic motion. Vertical motion on circular and cycloidal curves.

Motion with respect to linearly moving and rotating plane. Coriolis force and centrifugal force.

202- Algebra

Credits: 2

Algebra: Definition of a group with examples and simple properties, Subgroups, Generation of groups, Cyclic groups, Coset decomposition, Lagrange's theorem and its consequences. Homomorphism and Isomorphism. Permutation groups and Cayley's theorem. Normal subgroups, Quotient group, Fundamental theorem of Homomorphism. The Isomorphism theorems for groups.

203-Multivariable Calculus

Credits: 2

Functions of Two Variables: Limit, Continuity, Differentiability. Partial differentiation, Change of variables, Euler's, Taylor's theorem. Maxima and minima. Double and triple integrals, Change for order in double integrals. Beta and Gamma functions.

Vector Calculus: Gradient, Divergence and Curl. Greens, Stokes and Gauss Theorems with applications.



Recommended Books

1. R.S. Verma, A Text Book on Statics, Pothishala Pvt. Ltd., Allahabad.
2. S.L. Loney, An Elementary Treatise on the Dynamics of a Particle and of Rigid.
3. Bodies, Kalyani Publishers, New Delhi.
4. J.L. Synge, & B.A. Griffith, Principles of Mechanics, Tata McGraw-Hill, 1959.
5. Shanti Narayan, A. Text Book of Vector Calculus, S. Chand & Company, New Delhi.
6. S.C. Mallik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
7. Gabriel Klaumber, Mathematical Analysis, Marcel Dekkar, New York, 1975.
8. G.B. Thomas, R.L. Finney, M.D. Weir, Calculus and Analytic Geometry, Pearson Education Ltd, 2003.
9. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 1999.



ZOOLOGY
201-Cell Biology

Credits: 2

1. The Cell

- 1.1. Introduction to cell theory
- 1.2. Comparison of a generalized pro- and eukaryotic cell
- 1.3. Methods in Cell Biology: Elementary idea of microscopy and cell fractionation

2. Organization of cell

2.1. Extranuclear

- 2.1.1. Elementary knowledge of structure and function of plasma membrane
- 2.1.2. Introduction to endomembrane system (endoplasmic reticulum, Golgi complex, lysosome), peroxisome
- 2.1.3. Introduction to cytoskeleton
- 2.1.4. Structure and functions of mitochondria

2.2. Nuclear

- 2.2.1. Nuclear envelope, nucleolus and biogenesis of ribosome
- 2.2.2. Interphase chromatin and its compaction into metaphase chromosome
- 2.2.3. Introduction to polytene and lamp brush chromosomes

3. Cell reproduction

- 3.1. Basic features of cell cycle
- 3.2. Process and phases of meiosis and its significance

202- Biochemistry

Credits: 2

1. General

- 1.1. Chemistry of living system: its scope and importance, chemical bonds and energy
- 1.1. Biomolecules: configuration and conformation
- 1.2. Properties of water as biological solvent
- 1.3. Introduction to metabolism

2. Amino acids

- 2.1. Structure and classification
- 2.2. Properties of peptide bond



3. Proteins

- 3.1. Functions and diversity
- 3.2. Structural organization and conformation

4. Enzymes

- 4.1. General properties
- 4.2. Major classes of enzymes
- 4.3. Mechanism of enzyme action (binding to substrate, lowering of energy of activation, K_m and V_{max})

5. Carbohydrates

- 5.1. Classification and nomenclature
- 5.2. Structure and conformation of monosaccharide
- 5.3. Reducing and non-reducing sugars
- 5.4. Oligosaccharides (disaccharides) and polysaccharides

6. Lipids

- 6.1. Biological significance and classification
- 6.2. Fatty acids
- 6.3. Formation of lipid bi-layer

7. Nucleic acids

- 7.1. Bases, nucleosides and nucleotides
- 7.2. DNA structure: DNA double helix (Watson and Crick model)

Recommended Book

Cell Biology

- 1. Alberts et al: Essential Cell Biology (1998, Garland).
- 2. Alberts et al: Molecular Biology of the Cell (2008, Garland).
- 3. Karp: Cell and Molecular Biology (2008, John Wiley).
- 4. Lodish et al: Molecular Cell Biology (2008, Freeman).
- 5. Pollard & Earnshaw: Cell Biology (2002, Saunders).
- 6. Cooper & Hausman: The Cell A Molecular approach (2007, Sinauer)

Biochemistry

- 1. Boyer: Concepts in Biochemistry (3rd ed. 2006, Brooks/Cole)
- 2. Lehninger, Nelson & Cox: Principle of Biochemistry (4th ed., 2007, Worth).
- 3. Murray et al: Harper's Biochemistry (25th ed. 2000, Appleton & Lange).
- 4. Stryer: Biochemistry (5th ed. 2001, Freeman).
- 5. Conn, Stumpf, Bruening & Doi : Principles of Biochemistry (5th ed. 1987, Wiley)

Practical for Semester-II

Credits: 2

Part- A: Cell Biology

1. Drawing of ultrastructure of cell and different organelles (from photographs provided)
2. Familiarization with the student's light microscope and stereo binocular microscope
3. Application of centrifuge- separation of sperm from other testicular cells by low speed centrifugation
4. Diversity of eukaryotic cells- methylene blue staining of buccal epithelium, sperm, neurons, striated muscle cell; Leishman staining of mammalian blood cells
5. Permeability of plasma membrane- effect of isotonic, hypotonic and hypertonic solutions on mammalian RBC
6. Staining of nucleolus (RNA) and chromatin (DNA) with methyl green-pyronin
7. Staining of mitochondria with Janus green in buccal epithelium
8. Mitosis in onion root tip
9. Meiosis in grasshopper testis
10. Demonstration of preparation of polytene chromosomes from salivary glands of *Drosophila melanogaster* larva

Part- B: Biochemistry

1. Preparation of models of amino acids and dipeptides
2. Ninhydrin test for α -amino acids
3. To demonstrate catalase activity and its inactivation by heat
4. Benedict's test for reducing sugars
5. Iodine test for starch
6. Determination of acid value of oil
7. Preparation of models of nitrogenous bases, nucleosides and nucleotides

BOTANY
201- Microbiology and Plant Pathology

Credits: 2

1. History and scope of Microbiology.
2. Position of microorganisms in the living world; morphological, metabolic and molecular criteria for the classification of bacteria (scheme not required).
3. Structure of a bacterial cell: capsule and slime, flagella, cell wall, cell membrane, chromosome, plasmid and endospore.
4. Structure of bacteriophages belonging to 'T' series.
5. Lysogenic and lytic cycles.
6. Role of microorganisms in cycling of carbon and nitrogen.
7. Microorganisms and the production of alcoholic beverages, antibiotics and single cell protein.
8. General symptoms of viral, bacterial and fungal diseases of plants.
9. The study of the following plant diseases: Tobacco mosaic, citrus canker, late blight of potato, powdery mildew of pea, loose smut of wheat, covered smut of barley and wilt of pigeon pea.

202- Cytology and Genetics

Credits: 2

1. Ultrastructure of plant cell: Nucleus, cytoskeleton.
2. Cell cycle: Interphase nucleus: euchromatin and heterochromatin, mitosis, meiosis; genetic significance of meiosis.
3. Mendel's laws of inheritance: Law of dominance, law of segregation, law of independent assortment, deviation from Mendel's Law (Neo-Mendelism).
4. Interaction of genes: intragenic and intergenic interactions, Incomplete dominance, Lethal Genes, Complementary Genes, Supplementary Genes, Inhibitory Genes, Duplicate Genes, Epistatic Genes.
5. Linkage and crossing over: Interrelationships and importance, crossing over and meiosis, cytological basis of crossing over, crossing over and linkage maps, linkage groups, interference.
6. Sex determination: Bases of sex determination, chromosome theory of sex determination, sex determination in plants.



Practical for Semester-II
Practicals Based on Course -201&202

Credits: 2

Recommended Books

1. Sambamurthy, A. V. S. S. (2006). A Textbook of Plant Pathology, New Delhi: I. K. International Pvt. Ltd.
2. Sharma, A. K. & Sharma, A. (1999). Plant Chromosomes: Analysis, Manipulation and Engineering, Harward Academic Publishers.
3. Shukla, R. S. and Chandel, P. S. (2007). Cytogenetics, Evolution, Biostatistics and Plant Breeding, New Delhi: S.Chand & Company Ltd.
4. Singh, H. R. (2005). Environmental Biology, New Delhi: S. Chand & Company Ltd.
5. Snustad, D. P. & Simmons, M. J.(2000). Principles of Genetics, John Wiley & Sons, Inc.
6. Strickberger, M. W. (1990). Genetics, Macmillan Publishing Company.
7. Verma, P. S. and Agrawal, V. K.(2004). Cell Biology, Genetics, Molecular Biology, Evolution and Ecology, New Delhi: S. Chand & Company Ltd.

STATISTICS

201- Descriptive Statistics

Credits: 2

Bivariate data: Scatter diagram, product moment correlation coefficient and its properties, coefficient of determination, correlation ratio, interclass correlation, concept of error in regression, principle of least square, fitting of linear regression and related results, rank correlation.

Partial and multiple correlation in three variables, their measures and related results.

Theory of attributes: Independence and Association of attributes, various measures of association for two way and three way classified data.

202- Distribution Theory

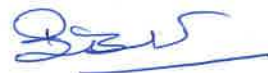
Credits: 2

Expectation of random variable and its properties, conditional expectation, moment in terms of expectation, moment generating function of a random variable, their properties and uses, probability generating function, Tchebycheff's inequality and its applications, convergence in probability and in distribution.

Discrete and continuous probability distributions and their properties including degenerate distribution.

Standard discrete and continuous distributions: Uniform, Binomial, Poisson, Geometric, Negative Binomial, Hypergeometric, Normal, Beta, Gamma, Bivariate Normal Distributions.

Brief review of basic distribution theory, joint, marginal conditional p.m.f.'s and p.d.f.'s, standard discrete and continuous distributions, bivariate normal, bivariate exponential, multivariate normal and multinomial distributions, functions of random variables and their distributions using Jacobian of transformation and other tools.



Recommended Books

1. Goon A.M., Gupta A.K. and Das Gupta B. (1999): Fundamental of Statistics, Vol. I, World Press, Calcutta.
2. Mood A.M., Greybill F.A. and Bose D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.
3. Hogg R.V. and Craig A.T. (1972): Introduction to Mathematical Statistics, Amerind Publishing Co.
4. Mukhopadhyay P. (1996): Mathematical Statistics, New Central Book Agency.
5. Rohtagi V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley and Sons.
6. Hoel P.G. (1971): Introduction to Mathematical Statistics, Asia Publishing House.

Practical for Semester-II Practicals Based on Course- 201 & 202

Credits: 2

Elementary ideas of binary number system, hardware and software components of computer system and DOS operating system will be given to the students.

The students will be required to do the practicals, listed below (based on the contents of the theory paper STB-201), using MS Excel:

1. Product moment correlation coefficient, correlation ratio, interaclass correlation coefficient.
2. Fitting of curves by least square method.
3. Regression of two variables.
4. Rank correlation.
5. Partial and Multiple correlations and regressions.
6. Fitting of discrete and continuous distributions.



Pedagogy Related
201: Psychological Dimensions of Education

Marks: 100 Credits: 4

Objectives

- a) The student teacher will be able to:-
- b) Understand the meaning and scope of Educational Psychology.
- c) Acquire knowledge and understanding of various stages of human development.
- d) Develop understanding of the process of learning in the context of various theories of learning and motivation.
- e) Understand the concepts of personality, intelligence and creativity.

Contents

Unit I: Educational Psychology and Development of Learner

- a) Educational Psychology: Meaning, nature, methods, scope and importance of Educational Psychology for teachers.
- b) Concept and principles of growth and development, stages of human development.

Unit II: Learning and Motivation

- a) Concept and nature of learning, factors influencing teaching-learning process. Memory and Retention.
- b) Theories of learning: Trial and error, classical conditioning, operant conditioning, theory of insight, constructivism and social learning.
- c) Motivation: Nature, types, some selected content and process theories with special referenced to Abraham Maslow, Alderfer, McClelland and Skinner's reinforcement theory, techniques of enhancing learner's motivation.

Unit III: Personality, Intelligence and Creativity

- a) Personality: Meaning, Nature, Trait, Type and Psychoanalytic theories; Methods of assessing Personality.
- b) Intelligence: Nature and Theories, Types of Intelligence, IQ, EQ and SQ; Measurement of Intelligence.
- c) Creativity: Meaning, Nature and Development of creativity among school children.



Unit IV: Psychology of Adjustment

- a) Behavioristic and Psychoanalytic models.
- b) Characteristics of a well-adjusted person.
- c) Stress in the context of Education: Types of stress; Stress management techniques, Role of teachers.

Practical Work

Each student will be required to administer any two psychological tests: Intelligence (verbal and non-verbal), creativity, personality, memory and aptitude.

Assignment

Conduct a case study on any child who has problems either in learning or in his/ her adjustment to the environment.

Transactional Strategies

Transaction of the course will be through lectures, discussion, multimedia presentations and interactive sessions.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be credited on the basis of evaluation in respect of sessional work.

Readings

1. Bernard, H.W. (1961), Mental Hygiene of Classroom Teachers, McGraw Hill, New York.
2. Bhatia, H.R. (1965), A Text Book of Educational Psychology, Asia Publishing House, Bombay.
3. Cronbach, L.J. (1958), Educational Psychology, Harcourt, New York (2nd ed.)
4. Dandekar, W.N. (1976), The Psychological Foundations of Education, Macmillan, Delhi.
5. Jacob, W. and Philip, W. (1962), Creativity and Intelligence, John Wiley, New York.
6. Kuppaswamy, B. (1986), Social Change in India, Vikas Publishing House, New Delhi.
7. Pandey, K.P. (2007), Advanced Educational Psychology, Vishwavidyalaya Prakashan, Varanasi.

SEMESTER -III

PHYSICS 301-Optics-I

Credits : 2

Interference

Conditions for sustained interference, Theory of interference, Lloyd's mirror, Achromatic fringes. Interference in parallel and wedge shaped films, Colour of thin films. Newton's rings and Michelson interferometer and their applications. Multiple beam interference in parallel film and Fabry-Perot interferometer.

Diffraction

Fresnel's diffraction, Zone plate, diffraction due to straight edge. Fraunhofer diffraction due to single and double slits, plane transmission grating and its resolving power.

302- Optics-II

Credits : 2

Polarization

Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering. Polarization by double refraction and Huyg n's theory, Nicol prism, Retardation plates, Production and analysis of circularly and elliptically polarized light. Optical activity and Fresnel's theory, Biquartz polarimeter.

Recommended Book

1. Physical Optics : B.K. Mathur and T.P. Pandya
2. A textbook of Optics: N.Subrahmanyam, Brijlal and M.N. Avadhanulu.
3. Geometrical and Physical Optics: Longhurst.
4. Introduction to Modern Optics: G.R. Fowels.
5. Optics: P.K. Srivastava.

Practical for Semester-III

Credits: 2

1. Determination of wavelength of sodium yellow line by Fresnel's Biprism.
 2. Determination of specific rotation of cane sugar by polarimeter.
 3. Determination of wavelength of mercury lines by diffraction grating.
 4. Determination of minimum resolution power of a telescope to distinguish two close objects at a large distance.
 5. Determination of self inductance of a coil by Anderson's bridge.
 6. To determine the velocity of ultrasonic waves
 7. To determine the wavelength of Balmer line of hydrogen atom
- In Semester-III, half of the students will do the experiments of Group-I and the other half will do the experiments of Group-II. In Semester IV, the students will exchange their groups. Addition and deletion in the list of experiments may be made from time to time by the department.

CHEMISTRY
301- Organic Chemistry-II

Credits: 2

1. **Aromaticity:** Aromaticity and Huckel rule - A general concept. Molecular orbital picture of benzene.
2. **Aromatic Electrophilic Substitution:** Mechanism of nitration, halogenation, sulphonation and Friedel-Crafts reactions (alkylation and acylation). Effects of substituents on orientation and reactivity.
3. **Aryl Halogen Compounds:** Chlorobenzene, electrophilic and nucleophilic aromatic substitutions; side chain chlorination of toluene, DDT and BHC.
4. **Chemistry of Carbonyl compounds:** Preparations and reactions: addition and condensation reactions; Cannizzaro, Perkin, aldol, benzoin, haloform, oxidation and reduction reactions. Important reactions of acids, HVZ reaction, Relative reactivity of acid chlorides, acid anhydrides, amides and esters. Comparative acidity of carboxylic and sulphonic acids.
5. **Phenols:** General methods of preparation and reactions. Reimer-Tiemann and Kolbe reactions. Relative acidity of phenol, alcohol and carboxylic acid.
6. **Nitrogen Containing compounds:** Nitrobenzene and reduction products. Comparative basicity of aliphatic and aromatic amines. **Diazonium Salts:** Preparation and synthetic applications.
7. **Poly nuclear Hydrocarbons:** Alternant and non-alternant hydrocarbons. Chemistry of naphthalene.

302-Physical Chemistry-II

Credits: 2

1. **Thermodynamics:** Second Law of Thermodynamics, Carnot cycle, entropy, entropy changes in reversible and irreversible processes and of universe, physical concept of entropy, entropy changes of an ideal gas in different processes, entropy of an ideal gas, entropy changes in mixture of gases. Joule-Thomson effect, Joule-Thomson coefficient of real (van der Waal) gases, inversion temperature.
Free energy and its concept, Gibbs and Helmholtz free energies and their relationship, variation of free energy with temperature and pressure. Free



energy and equilibrium constant. Maxwell's relations, Gibbs-Helmholtz equations, its application for the determination of ΔG , ΔH , ΔS of a reversible cell reaction. Criteria for reversible and irreversible processes based on entropy and free energy.

Partial molal quantities, chemical potential, the Gibbs-Duhem equation, determination of partial molal quantities, variation of chemical potential with temperature and pressure, chemical potential in case of a system of ideal gases.

2. **Phase Equilibria:** Thermodynamics of phase transition-Clapeyron-Clausius equation and its applications. Phase rule, phase component, degree of freedom, thermodynamic derivation of phase rule, phase diagrams of one-component system (water), two component systems (phenol-water, lead-silver). The distribution law, applications to cases of dissociation and association of solutes in one of the phases, solvent extraction, equilibrium constant from distribution coefficient ($K_1 + I_2 = K_3$).
3. **Electrochemical Cells:** Reactions in reversible cells, free energy and *emf* of reversible cell. Single electrode potential (Nernst equation), its measurement and sign convention. Standard electrode potential. *Emf* of reversible cell from electrode potentials. Types of reversible electrode, reference electrodes. Applications of *emf* measurements: determination of ionic activities, pH, and equilibrium constant. Potentiometric titration. Concentration cells with and without transference. Liquid junction potential and its elimination.
4. **Chemical Kinetics:** Order and molecularity of chemical reactions, pseudo order. Kinetic law for second order reactions, determination of the rate constant and order of reaction from kinetic data. Effect of temperature on rate of reaction: collision theory of rates of bimolecular reactions and its comparison with Arrhenius equation.

Complex reactions: Reversible (first order in both directions), concurrent, consecutive reactions. Animalcular gas reactions (Lindmann theory), steady-state approximations, theory of absolute reaction rate and its thermodynamic formulation.



Practical for Semester-III

Credits: 2

Quantitative Analysis (Physical and Volumetric)

1. Critical Solution Temperature.
2. Effect of impurity on Critical Solution Temperature.
3. Distribution of solute in two immiscible solvents (without association).
4. Distribution of solute in two immiscible solvents (with association in one solvent).
5. Determination of pH of a given buffer.

Recommended Books

1. *Organic Chemistry*, Paula Y. Bruice, 2nd Edition, Prentice-Hall, International Editioni (1998).
2. *Organic Chemistry*, R. T. Morrison & R. N. Boyd, 6th Edition (1992), Prentice-Hall of India (P) Ltd., New Delhi.
3. *Organic Chemistry*, I. L. Finar, [Vol. I , 6th Edition (1973), Reprinted in 1980 & Vol. II, 5th Edition (1975), Reprinted in 1996], ELBS and Longman Ltd., New Delhi.
4. *Organic Chemistry*, L.G. Wade Jr. 5th Edition (2001), Prentice-Hall International INC. USA.
5. *Organic Chemistry*, J. Clayden, N. Greeves, S. Warren & E. Wothers Oxford Univ. Press, Oxford (2001).
6. *Physical Chemistry*, P.C. Rakshit, 5th Edition (1985), 4th Reprint (1997), Sarat Book House, Calcutta.
7. *Principles of Physical Chemistry*, B.R. Puri, L.R. Sharma & M.S. Pathania, 37th Edition (1998), Shoban Lal Nagin Chand & Co., Jalandhar.
8. *Physical Chemistry*, K.J. Laidler and J.M. Meiser 3rd Edition, Houghton Mifflin Comp., New York, International Edition (1999).

MATHEMATICS
301-Differential Equations

Credits: 2

Ordinary differential equations of first order: initial and boundary conditions, homogeneous equations, linear equations, Exact differential Equation. First order higher degree equations solvable for x , y , p . Singular solution and envelopes.

Linear differential equations with constant coefficients, homogeneous linear differential equations, linear differential equations of second order with variable coefficients.

Series solutions of differential equations. Bessel and Legendre equations. Bessel and Legendre functions.

302-Tensor & Geometry

Credits: 2

Contravariant and Covariant vectors, Transformation formulae, Symmetric and Skew symmetric properties, Contraction of tensors, Quotient law.

Polar equation of a conic, Sphere, Cone, Cylinder, Paraboloids, Central Conicoids.

303-Partial Differential Equations

Credits: 2

Linear partial differential equations of first order. Non linear PDE of first order: Charpit's method.

Linear partial differential equation of second and higher order of homogeneous and non-homogeneous forms with constant coefficients. Second order PDE with variable coefficients. Monge's method. Solution of heat and wave equations in one and two dimensions by method of separation of variables.

Recommended Books

1. Gorakh Prasad, Integral Calculus, Pothishala Private Ltd. Allahabad.
2. S. Balachandra Rao & H.R. Anuradha, Differential Equations with Applications and Programmes, University Press, Hyderabad, 1996.
3. R.S. Senger, Ordinary Differential Equations with Integration, Prayal Publications, 2000.
4. D. A. Murray, Introductory Course in Differential Equations, Orient Longman (India), 1967.
5. E. A. Codington, An Introduction to Ordinary Differential Equations, Prentice Hall of India. 1961.
6. B. Rai, D.P. Choudhary, Ordinary Differential Equations, Narosa Publication, 2004.
7. Barry Spain, Tensor Calculus, Radha Publ. House Calcutta, 1988.
8. R. S. Mishra, A Course in Tensors with Applications to Riemannian Geometry, Pothishala Pvt. Ltd., Allahabad.
9. R. J. T. Bell, Elementary Treatise on Co-ordinate geometry of three dimensions, Macmillan India Ltd., 1994.
10. Shanti Narayan, Analytical Solid Geometry, S. Chand & Company, New Delhi.
11. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Son Inc., New York, 1999.
12. I. N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill Book Company, 1988.
13. B.S. Rao & H.R. Anuradha, Differential Equations, University Press, 1996.
14. W.T.H. Piaggio, Elementary Treatise on Differential Equations and their applications, CBS Publishers New Delhi, 1985.

ZOOLOGY

301-Comparative Physiology and Developmental Biology

Credits: 2

1. Respiration

- 1.1. Types of respiration (cutaneous, branchial, tracheal and pulmonary)

2. Circulation

- 2.1. Composition of blood
- 2.2. Functions of blood

3. Nutrition and Digestion

- 3.1. Mechanical and chemical digestion
- 3.2. Basic concept of absorption

4. Excretion: Mode of excretion of nitrogenous wastes: ammonotelism, ureotelism, uricotelism and guanotelism

5. Movements

- 5.1. Ameboid, ciliary, flagellar and muscular
- 5.2. Basic concept of contractile proteins

6. Neuronal transmission

- 6.1. Structure and type of neurons
- 6.2. Membrane potential and nature of nerve impulse

7. Developmental Biology

- 7.1. Historical perspective, aim and scope of developmental biology
- 7.2. Gametogenesis
 - 7.2.1. Spermatogenesis
 - 7.2.2. Oogenesis
- 7.3. Events in external and internal fertilization
- 7.4. Types of cleavage and fate map
- 7.5. Gastrulation in frog and chick up to the formation of three germ layers
- 7.6. Extra embryonic membranes in chick

302- Endocrinology

Credits: 2.

1. Introduction to Endocrinology

- 1.1. Definition and classification of hormones
- 1.2. Endocrine, paracrine and autocrine modes of hormone delivery
- 1.3. Feedback mechanisms

2. Structure and functions of endocrine glands in mammals

- 2.1. Pituitary
- 2.2. Thyroid
- 2.3. Parathyroid
- 2.4. Adrenal
- 2.5. Endocrine pancreas
- 2.6. Testis
- 2.7. Ovary

3. Endocrine glands in insects

- 3.1. The Pars Intercerebralis-corpus cardiacum-corpus allatum complex
- 3.2. Prothoracic gland

Recommended Books

Comparative Physiology

1. Nielson : Animal Physiology-Adaptation and Environment (5th ed. 2008, Cambridge)
2. Marshall & Hughes: Physiology of Mammals and Vertebrates (2nd ed. 1980, Cambridge)
3. Hoar: General and Comparative Physiology (3rd ed.1987, Prentice Hall)
4. Prosser : Comparative Animal Physiology (4th ed.1991, Satish Book)

Endocrinology

1. Hadley: Endocrinology (5th ed. 2000, Prentice Hall)
2. Turner & Bagnara: General Endocrinology(6th ed. 1984, Saunders)



Developmental Biology

1. Alberts et al: Molecular Biology of the Cell (2008, Garland)
2. Balinsky : An Introduction to Embryology (1981, CBS)
3. Gilbert : Developmental Biology (8th ed. 2006, Sinauer)
4. Wolpert : Principles of Development (3rd ed. 2007, Oxford)

Practical for Semester-III

Credits: 2

Comparative Physiology & Developmental Biology

Determination of pulse rate at rest and after exercise

1. To observe capillary circulation in web of frog
2. Preparation of hemin crystals from blood of rat
3. To demonstrate activity of salivary amylase and effect of acid and heat on its activity
4. Semi-quantitative test for detection of glucose by Benedict's method
5. Determination of presence of protein in a sample
6. To demonstrate knee-jerk reflex
7. To demonstrate existence of blind spot of eye
8. To Determine the near point of eye

Developmental Biology

1. Study of different types of eggs
2. Demonstration of sperm motility in rat
3. Study of eggs and tadpoles of frog from collected/preserved material
4. Study of frog development through models
5. Window preparation on hen's egg
6. Demonstration of chick embryonic development making window preparation of fertilized egg 6. Study of whole mount preparations of chick embryos of 16-18, 24-28, 33-36 and 42-48 hrs of development

Endocrinology

1. Handling, sexing, numbering and maintenance of rat
2. General survey of endocrine glands in rat
3. Study of vaginal smear preparation of rat
4. Demonstration of the following surgical operations in rat Orchidectomy (b) Ovariectomy
5. Study of histological slides of the following endocrine glands in rat: pituitary, thyroid, adrenal, endocrine pancreas, testis and ovary
6. Demonstration of endocrine glands in cockroach



BOTANY
301- Phanerogams-I

Credits: 2

Gymnosperms

- (a) Classification (Sporne).
- (b) Morphology, anatomy, reproduction and economic importance of: *Cycas*, *Pinus*, *Ephedra*.

Angiosperms

Taxonomy

- 1. Bentham and Hooker's system of classification: Principles, outline, merits and demerits.
- 2. Distinguishing characteristics of the following families and their economic importance: Ranunculaceae, Apiaceae, Cucurbitaceae, Rubiaceae, Asclepiadaceae, Apocynaceae, Solanaceae, Amaranthaceae, Poaceae.
- 3. Brief account of Plant collection and herbarium techniques and important herbaria of world.

302-Phanerogams-II

Credits: 2

- 1. Anatomy of stems and roots with special reference to plants showing anomalies: Stem: *Nyctanthes*, *Boerhaavia*, *Dracaena*, and root: *Vanda*.
- 2. Embryology - General Account
 - i. Microsporangium and Microsporogenesis.
 - ii. Megasporangium and Megasporogenesis.
 - iii. Male gametophyte.
 - iv. Female gametophyte (monosporic, bisporic and tetrasporic embryo sac).
 - v. Double fertilization.
 - vi. Endosperm (Different modes of development, functions of endosperm).

Practical for Semester-III
Practicals Based on Course- 301 & 302

Credits: 2

Recommended Books

1. Bhojwani, S. S. & Bhatnagar, S. P.(2000). The Embryology of Angiosperms, Delhi: Vikas Publishing House.
2. Davis, P. H. and Heywood, V. H.(1963). Principles of Angiosperm Taxonomy, London: Oliver and Boyd.
3. Maheswari, P. (1971). An Introduction to Embryology of Angiosperms. McGraw Hill Book Co.
4. Pandey, B. P. (2001). College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, New Delhi: Chand & Company Ltd.
5. Pandey, B. P. (2006). College Botany, Vol. II: Pteridophyta, Gymnosperms and Paleobotany, New Delhi:S. Chand & Company Ltd.
6. Pandey, B. P. (2007). Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics, New Delhi: S. Chand & Company Ltd.
7. Sporne, K. R. (1965). Morphology of Gymnosperms, London: Hutchinson Co., Ltd.
8. Vashishta, P. C., Sinha, A. K. & Anil Kumar (2006). Botany - Pteridophyta (Vascular Cryptogams), New Delhi: Chand & Company Ltd.
9. Parihar, N.S., Gymnosperms, Central Book Depo Allahabad.



STATISTICS
301- Statistical Inference

Credits: 2

Concept of random sample from a distribution, statistic and its sampling distribution, standard error of an estimate, standard errors of sample mean and proportion, sampling distribution of sum of Binomial, Poisson random variables and mean of normal distribution, requirement of a good estimator with examples. Simple, composite null and alternative hypotheses, critical region, types of error, level of significance, p-values, size and power of a test, chi-square, t and f distributions and their properties (without proof), testing of equality of two means and two variances of two normal distributions, testing for the significance of sample correlation coefficient and testing the equality of means and variances of bivariate normal distributions.

Recommended Books

1. Mood A.M., Greybill F.A. and Bose D.C. (1974): Introduction to the theory of Statistics, McGraw Hill.
2. Freund J.E. (2001): Mathematical Statistics, Prentice Hall of India.
3. Goom A.M., Gupta M.K. and Das Gupta B. (1991): fundamental of Statistics, Vol. I, World Press, Calcutta.
4. Rohtagi V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley and Sons.
5. Rao C.R. (1973): Linear Statistical Inference and its Applications, Revised edition, Weley Eastern.
6. Hoges J.L. and Lehmann E.L. (1964): Basic Concepts of Probability and Statistics, Holden Day.
7. Snedecor G.W. and Cochran W.G. (1967): Statistical Methods, Iowa State University Press.



302- Sample Surveys and Design of Experiments

Credits: 2

Concept of population and sample, need for sampling, complete enumeration versus sampling, Basic concepts in sampling, sampling and Non-sampling errors, Acquaintance with the working (questionnaires, sampling design, methods followed in field investigation, principal findings etc.) of NSSO and other agencies under taking sample surveys.

Simple random sampling with and without replacement, estimation of population mean, population proportions and their standard errors. Stratified random sampling, proportional and optimum allocation, comparison with simple random sampling for fixed sample size.

Ratio, product and regression methods of estimation, estimation of population mean, evaluation of bias and variance to the first order of approximation, comparison with simple random sampling.

Systematic sampling (when population size (N) is an integer multiple of sampling size (n)). Estimation of population mean and standard error of this estimate, comparison with simple random sampling. Elementary idea of cluster sampling.

Analysis of variance for one way and two way classifications, need for design of experiments, basic principle of experimental design: randomization, replication and local control, complete analysis and layout of completely randomized design, randomized block design and Latin square design.

Factorial experiments and their advantages, main and interaction effects in 2×2 and 2×3 factorial experiments.

Recommended Books

1. Cochran W.G. (1977): Sampling Techniques, John Wiley and Sons, New York.
2. Sukhtme P.V., Sukhatme B.V., Sukhatme S. and Asok C. (1984): Sampling Theory of Surveys with Applications, Indian Society of Agricultural Statistics, New Delhi.



3. Goon A.M., Gupta M.K. and Das Gupta B. (1986): Fundamental of Statistics, Vol. II, World press, Calcutta.
4. Sampath S. (2000): Sampling Theory and Methods, Narosa Publishing House, New Delhi.
5. Des Raj (2000): Sample Survey Theory, Narosa Publishing House, New Delhi.
6. Murthy M.N. (1967): Sampling Theory and Methods, Statistical Publishing Society, Calcutta Press.
7. Kish L. (1965): Survey Sampling, John Wiley and Sons, New York.
8. Hansen M.H., Hurwitz, W.N. and Madow W.G. (1975): Sample Survey Method and Theory, Vol. I, Methods and Applications, Vol. II, Wiley Publication, New York and London.
9. Cochran W.G. and Cox G.M. (1957): Experimental Design, John Wiley and Sons.
10. Das M.N. and Giri J. (1986): Design and Analysis of Experiments, Springer Verlag.
11. Kempthorne O. (1965): The Design and Analysis of Experiments, Wiley Eastern.

Practical for Semester-III

Practicals Based on Course -301 & 302

Credits: 2

Programming with FORTRAN: The students will be given basic introduction of FORTRAN, such as:

FORTRAN character codes, constants, variables, names, arithmetic, logic and relational operators, expression, arithmetic, relational and logical expression, rules for writing arithmetic expressions, commands for using FORTRAN compiler.

Writing FORTRAN programs for simple mathematical expressions such as, factorial of a positive integer, summation of simple finite series, solution of some mathematical expressions.

Pedagogy Related
301: Educational Management and Leadership

Marks- 100 Credits- 4

Objectives

The student- teachers will be able to:-

1. Appreciate the Principles, Meaning, Scope, Importance and advantages of School Management.
2. Get acquainted with the concepts of School discipline, School administration, Management, Supervision and Human Relations.
3. Acquire the needed competencies to achieve excellence in managing a school/ classroom.

Contents

Unit I: Concept of School Management

- (a) Meaning and Scope of School Management: Difference between management and leadership.
- (b) Nature and Importance of Management processes.
- (c) Fundamental Principles of School Management leadership in the present context.

Unit II: Maintaining a Secondary School for attaining excellence

- (a) Planning and Executing: Year-plan of the School activities, Work load, School timings, time-table.
- (b) Controlling and Monitoring Duties and Functions of Head master, Supervisor, teacher and non-teaching staff. Forming committees, Co-ordination committee; governing body of the School and its role and functions. Supervision and Inspection-Meaning, type, purpose and procedure.
- (c) Financing: Sources of grants, budgeting and auditing procedure, Income generation- Endowment funds, reserve funds and development funds.

Unit III: Management and Leadership

- (a) Concept and Importance of Classroom Management and leadership differentiated.
- (b) Difference between School and Classroom Management, School management and School Organization, School Management and School administration.



(c) School Administration: meaning and types. Academic leadership: Situational leadership style (SLS).

(d) School discipline: Concept and its development.

(e) Human Relations in a school set up.

Unit IV: Achieving Excellence Through Leadership

(a) Criteria of grading a School.

(b) Total Quality Management (TQM): Concept, objectives and importance.

(c) SWOT Analysis: Concept and its Educational Implications.

(d) Resource development- Human, Material and Finance.

Assignment

Locating Strength and Weaknesses of any Educational Institution.

Transactional Strategies

The course content will be transacted through lectures, discussions, tutorials and report preparations.

Evaluation

The course content will be of 4 credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be awarded on the basis of sessional work.

Readings

1. Agarwal, J.C. (1967), Educational Administration, Arya Book Depot, New Delhi.
2. Bhatnagar and Varma, (1978), Educational Administration, Loyal Book Depot, Meerut.
3. Bush, T. (1980), Approaches to School Management, Harper & Raw, London.
4. Khanna and Others (1983), School Administration, Planning, Supervision and Financing, Doaba House, Delhi.
5. Kochhar, S.K. (1964), Secondary School Administration, University Publishers, Delhi.
6. Mathur and Kohli, (1970). School Administration and Organization, Krishna Brothers, Jalandhar.
7. Mukhopadhyay, M., Management of Change in Education, In search of India Model, NUEPA, New Delhi.



8. Neelam Sood (2003), Management of School Education, A.P.H, New Delhi.
9. Saffaya and Shaida (1980), School Administration and Organization, Dhanpat Rai and Sons, Jalandhar.
10. Mukhapadhyay, Marmer, Total Quality Management in Education, NIEPA, 2001, New Delhi.



302: Educational Measurement and Evaluation

Marks- 100 Credits- 4

Objectives

The student teacher will be able to:-

1. Grasp the basic concepts in measurement and evaluation.
2. Develop skills and competencies for the use of basic techniques in the field of measurement and evaluation.
3. Acquire skills about test designing.
4. Understand the use of relevant statistical measures and their applications.

Contents

Unit- I: Concept and Techniques of Evaluation

- (a) Educational Measurement and Evaluation: Concept, Purpose, Tools and Techniques of evaluation: Levels of measurement-nominal, ordinal, interval and ratio. Taxonomy of educational objectives and its relevance for measurement and evaluation.
- (b) New concepts of Evaluation-Formative, Summative and Continuous-and-Comprehensive-Evaluation (CCE).
- (c) Norm Referenced and Criterion Referenced Testing (NRT and CRT).

Unit- II: Designing of tests for evaluation of learning outcomes

- (a) Principles of test construction and standardization.
- (b) Characteristics of a good test- reliability, validity, objectivity and practicability.

Unit- III: Instructional Objectives and their use in test construction

- (a) Instructional Objectives and objective based evaluation.
- (b) Classification of test items-essay type and objective type test items and their construction procedures.

Unit -IV: Educational Statistics

- (a) Concept of statistics, Graphical representation of data.
- (b) Measures of Central Tendency- Mean, Median and Mode.
- (c) Measures of Variability- Quartile deviation, Average Deviation and Standard Deviation.
- (d) Percentiles and Percentile Rank.
- (e) Coefficient of correlation- Rank difference and Product moment.
- (f) Concept of scaling- C scaling and T scaling.



Assignment

Preparation and administration of an achievement test.

Transactional Strategies

The course content will be implemented mainly through lectures integrated with Information & Communication Technology (ICT). In addition to this, discussion, brainstorming and quiz sessions will be used as the transactional strategies particularly for units- I, II and III.

Evaluation

The course content will be of 4 credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be credited on the basis of evaluation of sessional work.

Readings

1. Allen, J.P.B. and Davis (1977), Testing and Experimental Methods, Oxford University Press, London.
2. Anastasi, A. (1968), Psychological Testing: McMillan and Co., London.
3. Bloom, B.S. (1968), Taxonomy of Educational Objectives, David McKay Co., New York.
4. Ebel, R.L. (1979), Essential of Educational Measurement and Evaluation, Prentice Hall, New Delhi.
5. Garrett, Henry E. (2004), Statistics in Psychology and Education (Tenth Indian Reprint), Vakils, Feffer and Simons Ltd, New Delhi.
6. Gupta, S.P. (1993), Measurement and Evaluation, Sharda Publications, Allahabad.
7. Nunally, J.C. (1972), Educational Measurement and Evaluation, McGraw Hill Book Company, New York.
8. Singh, A.K. (2006), Tests, Measurement and Research Methods in Behavioral Sciences, Bharti Bhawan Printers, Patna.
9. Thorndike R.L. & Hagen, E. (1969), Measurement and Evaluation in Psychology and Education, Tata McGraw, New Delhi.
10. Pandey, K.P., Fundamentals of Educational Measurement and Evaluation, Vishwavidyalaya Prakashan, Varanasi.



SEMESTER- IV

PHYSICS **401-Electromagnetic Theory**

Credits: 2

Vector Calculus

Gradient, divergence and curl operators; Introduction to Gauss's divergence and Stoke's theorem.

Electromagnetism

Laws of Electromagnetism using vector calculus; electrostatics and magnetostatics in matter, concepts of electric and magnetic polarizations, bound charges and currents; electrodynamics and displacement current, Maxwell's equations in integral and differential forms; Concepts of vector and scalar potentials, and gauge transformations, Poynting vector, energy and momentum conservation.

402-Basic Electronics

Credits: 2

EM wave propagation

EM wave equations and their solutions; Polarization; Propagation of plane EM waves in free space, dielectrics (absorption coefficient) and conductors (skin depth and plasma frequency): Laws of reflection, transmission at normal and oblique incidence in linear media and conducting media (Fresnel's equations and Brewster's angle).

Physics of Semiconductors

P-N junction diode, depletion width and potential barrier, junction capacitance, I- V characteristics, Rectifier, ripple factors, filter circuits, efficiency and percentage regulation, LED, photodiode.

Transistor circuits, Input, Output characteristics and CB and CE modes, Early effect, α and β parameters; DC load line, operating point, biasing and bias- stabilization circuits: Transistor as an amplifier (CE mode) and frequency response.

Recommended Books

- 1- Introduction to Electrodynamics (3rd Edition) : David J. Griffiths.
- 2- EM Waves and Fields : P.Lorrain and O.Corson.
- 3- Electronic Devices and Circuits: J. Millman and C.Halkias.
- 4- Electronics Fundamental and Application : D. Chattopadhyay and P.C. Rakshit.
- 5- Principle of Electronics : V.K. Mehta.



Practical for Semester-IV

Credits: 2

1. Determination of wavelength of sodium yellow line by Newton's rings.
2. To determine the Plank's constants by Wein's radiation formula using an LDR.
3. To determine diameter/thickness of a thin wire by diffraction method.
4. Measurement of energy band gap of Si using a p-n junction diode.
5. Determination of mutual inductance of a pair of coils.
6. Phase shift between the current and the applied voltage in (a) C.R., (b) L.R. (c) L.C.R. circuits using a CRO and an oscillator.
7. To draw the input and output characteristics of a p-n-p transistor.
8. Resolving power of prism



CHEMISTRY
401- Inorganic Chemistry-II

Credits: 2

1. **Acids and bases:** Bronsted-Lowry, Lux-Flood, Solvent System and Lewis concepts of acids and bases. Factors affecting strengths of Lewis acids and bases. HSAB theory and applications.
2. **Non-aqueous solvents:** Physical properties of a solvent for functioning as an effective reaction medium, types of solvents and their general characteristics. Liquid NH₃ as a non- aqueous solvent.
3. **Coordination compounds:** Nomenclature, Werner's theory. Isomerism. Sidgwick's EAN concept and Valence Bond Theory. Stereochemistry of coordination compounds with coordination no. 4, 5 and 6.

402- Selected Topics in Chemistry

Credits: 2

1. **Energy devices:** Batteries; Fuel cells, Solar cells, Biomass as renewable energy resources.
2. **Corrosion:** Causes of metallic corrosion, types of corrosion, measurements of corrosion by weight loss method, prevention (electrochemical and inhibitor).
3. **Green Chemistry:** Principles and concept of green chemistry, atom economic and non-economic reactions, reducing toxicity, a few examples of environment friendly reactions and reaction media.
4. **Photoisomerization:** Rotation about C-C and C=C bonds, Structure of Rhodospin, Mechanism of vision.
5. **Bioenergetics:** Gibbs and Helmholtz energies with special emphasis on biological applications: study of energy transformations in living systems (bioenergetics): standard state in biochemistry, ATP-the currency of energy, Glycolysis, limitation of applicability of thermodynamics in biology.



Practical for Semester -IV

Credits: 2

Quantitative Analysis (Physical and Volumetric)

1. Coagulation of a solution.
2. Determination of Surface Tension of liquids.
3. Determination of viscosity coefficients of liquids.
4. Complexometric titrations: Zn^{2+} , Mg^{2+} , Ca^{2+} , Fe^{2+} with EDTA; Hardness of water.
5. Iodimetric titration.

Recommended Books

1. *Recent Aspects in Inorganic Chemistry*, R.C. Agarwal, Kitab Mahal.
2. *Inorganic Chemistry*, J.E. Huheey, E.A. Keiter and R.L. Keiter..
3. *Basic Inorganic Chemistry*, F.A. Cotton, G. Wilkinson and L. Paul Gaus 3rd Edition (1995), John Wiley & Sons, New York.
4. *Physical Chemistry for the Chemical and Biological Sciences*, Raymond Chang; University Science Book, California (2000).
5. *New Trends in Green Chemistry*, V.K. Ahluwalia and M. Kidwai, Anamaya Publication, New Delhi (2004).
6. *Green Chemistry: Environmentally Benign Reactions*, V.K. Ahluwalia, Anamaya Publication, New Delhi (2007).
7. *Modern Molecular Photochemistry*, N.J. Turro, University Science Books, Sausalito, California (1991).
8. *Green Chemistry: An Introductory Text*, Mike Lancaster, RSC Paperback Edn., (2002).



MATHEMATICS
401- Mathematical Methods

Credits: 2

Integral Transforms: Laplace Transformation, Laplace Transforms of derivatives and integrals, shifting theorems, differentiation and integration of transforms, convolution theorem. Application of Laplace transform in solution of ordinary differential equations. Fourier series expansion.

Calculus of Variations: Functionals, Deduction of Euler's equations for functionals of first order and higher order for fixed boundaries. Shortest distance between two non-intersecting curves. Isoperimetric problems. Jacobi and Legendre conditions (applications only)

402- Abstract Algebra

Credits: 2

Automorphism and inner automorphism, Automorphism groups and their computations. Normalizer and centre, Group actions, stabilizers and orbits. Finite groups, Commutator subgroups. Rings, Integral Domains and Fields. Ideal and quotient Rings. Ring Homomorphism and basic isomorphism theorems. Prime and maximal ideals. Fields of quotients of an integral domain. Principal ideal domains. Polynomial Rings, Division algorithm. Euclidean Rings, The ring $\mathbb{Z}[i]$.

403- Programming C

Credits: 2

C fundamentals. Constants, Variables and Data types, Operators and expression, formatted input and output. Decision makings, Branching and Looping. Arrays. User defined functions. Structures. Pointers. File handling. Programming based on above.



Recommended Books

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Son Inc New York, 1999.
2. N. Kumar, An Elementary Course on Variational Problems in Calculus, Narosa Publications, New Delhi.
3. A.S. Gupta, Text Book on Calculus of Variation, Prentice Hall of India.
4. S.G. Deo, V. Lakshmikanthna & V. Raghavendra, Text Book of Ordinary Differential Equations, Tata McGraw- Hill.
5. F. B. Hilderbrand, Advanced Calculus for Applications, PHI, New Delhi, 1997.
6. B. Rai, D.P. Choudhary, H.I. Freedman, Ordinary Differential Equations, Narosa Publication, 2002.
7. P. B. Bhattacharya, S. K. Jain, & S. R. Nagpal, Basic Abstract Algebra (2nd Edition), Cambridge University Press, Indian Edition, 1977.
8. N. Herstein, Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
9. N. Jacobson, Basic Algebra, Vol. I and Vol. II, W. H. Freeman, 1980. (Also Published by Hindustan Publishing Company)
10. B.W. Kernighan and D.M. Ritchie, The C Programming Language 2nd Edition, (ANSI features) Prentice Hall, 1989.
11. V. Rajaraman, Programming in C, Prentice Hall of India, 1994.
12. Byron, S. Gotfried, Theory and Problems of Programming with C, Tata McGraw-Hill, 1998.
13. Henry Mullish & Herbert L. Cooper, Spirit of C: An introduction to Modern Programming, Jaico Publishers, Bombay.
14. E. Balagurusamy, Programming in ANSI C, Tata McGraw Hill, New Delhi.

ZOOLOGY

401- Evolution and Animal Behaviour

Credits: 2

- 1. Concept of organic evolution**
- 2. Evidence of Organic evolution from**
 - 2.1. Comparative anatomy
 - 2.2. Comparative embryology
 - 2.3. Palaeontology
 - 2.4. Biochemistry and Genetics
 - 2.5. Zoogeography
- 3. Theories of organic evolution**
 - 3.1. Lamarckism
 - 3.2. Darwinism
 - 3.3. Development and concept of synthetic theory
 - 3.4. Natural selection in action (industrial melanism, antibiotic and DDT resistance)
- 4. Evolution of man**
- 5. Concepts and patterns of behaviour**
- 6. Instinct and learning**
 - 6.1. Innate behaviour
 - 6.2. Learned behaviour and types of learning
- 7. Genetic basis of behaviour**
- 8. Control of behaviour**
 - 8.1. Neural control
 - 8.2. Hormonal control
- 9. Social organization**
 - 9.1. Communication
 - 9.2. Living in groups
 - 9.3. Evolution of sociality: eusocial organisation
- 10. Biological rhythms**



402-Genetics

Credits: 2

1. **Elements of heredity and variation**
 - 1.1. Mendel and his experiments
 - 1.2. Principles of segregation and independent assortment and their chromosomal basis
 - 1.3. Test cross
 - 1.4. Application of laws of probability to Mendelian inheritance
2. **Extension of Mendelism**
 - 2.1. Dominance relationships (complete dominance, incomplete dominance and co-dominance)
 - 2.2. Multiple allelism
 - 2.3. Lethal alleles
 - 2.4. Pleiotropy
 - 2.5. Epistasis
 - 2.6. Penetrance and expressivity
 - 2.7. Phenocopy
 - 2.8. Polygenic inheritance
3. **Cytoplasmic and infective inheritance**
4. **Linkage**
 - 4.1. Linkage and crossing over
 - 4.2. Cytological demonstration of crossing over in *Drosophila*
5. **Sex chromosomes and sex-linkage**
 - 5.1. Sex chromosome systems: XX/XO, XX/XY, ZZ/ZW and haploidy/diploidy types
 - 5.2. Sex Linkage
6. **Structural and numerical alterations of Chromosomes meiotic consequences in structural heterozygotes**
7. **Human Genetics**
 - 7.1. Karyotype, banding, nomenclature of chromosome subdivisions and genetic map
 - 7.2. Genetic disorders
 - 7.2.1. Chromosomal aneuploidy (Down, Turner and Klinefelter syndromes)
 - 7.2.2. Chromosome translocation (chronic myeloid leukemia) and deletion ("cry of cat" syndrome)
 - 7.2.3. Gene mutation (cystic fibrosis)
 - 7.3. Genetic counseling

Recommended Books

Genetics

1. Brooker: Genetics Analysis and Principles (1999 Addison-Wesley)
2. Gardner et al : Principles of Genetics (1991, John Willey)
3. Griffith et al: An Introduction to Genetic Analysis (2005, Freeman)
4. Hartl & Jones : Essential Genetics: A Genomic Perspective (2002, Jones & Bartlett)
5. Russell : Genetics (2002, Benjamin Cummings)
6. Snustad & Simmons: Principles of Genetics (2006, John Wiley)
7. Lewin : Genes IX (2008, Jones & Bartlett)

Evolution

1. Moody : Introduction to Evolution (1978, Kalyani)
2. Savage : Evolution (1963, Holt, Reinhart and Winston)
3. Rastogi : Organic Evolution (1988, Kedarnath & Ramnath)
4. Strickberger : Evolution (2004, Jones & Bartlett)

Animal Behaviour

1. Drickamer & Vessey: Animal Behaviour-concepts, processes and methods (2nd ed. 1986, Wadsworth)
2. Freeland : Problems in Practical Advanced Level Biology (1985, Hodder & Stoughton)
3. Goodenough et al : Perspectives on Animal Behaviour (1993, Wiley)
4. Grier : Biology of Animal Behaviour (1984, Mosby)
5. Lorenz : The Foundation of Ethology (1981, Springer)
6. Manning & Dawkins : An Introduction to Animal Behaviour (5th ed. 1998, Cambridge)
7. Mcfarland : Animal Behaviour, Psychology, Ethology and Evolution (1985, Pitman)
8. Slater : An Introduction to Ethology (1985, Cambridge)

Practical for Semester-IV

Credits: 2

Genetics

1. Application of probability in the law of segregation with coin tossing
2. Frequency of the following genetic traits in human: widow's peak, attached ear lobe, dimple in chin, hypertrichosis, colour blindness, PTC tasting
3. Study of mode of inheritance of the following traits by pedigree charts - attached ear lobe, widow's peak
4. Familiarization with techniques of handling *Drosophila*, identifying males and females; observing wild type and mutant (white eye, wing less) flies and setting up cultures

5. Study of penetrance and expressivity using *wingless (wg)* mutant of *Drosophila*
6. Demonstration of sex-linked inheritance in *Drosophila* making a cross between white eye and wild type flies (*criss-cross inheritance*).
7. Demonstration of lethal alleles using *Curly (Cy)* mutant in *Drosophila*
8. Demonstration of multiple allelism by showing mutants of white eye series in *Drosophila*
9. Study of structural chromosome aberrations (dicentric, ring chromosomes and inversions in polytene chromosome) from prepared slides/photographs
10. Study of human karyotypes and numerical alterations (Down syndrome, Klinefelter syndrome and Turner syndrome)

Evolution

1. Adaptive modifications in feet of birds and mouth parts of insects (from slides)
2. Embryological evidence of evolution (through charts)
3. Analogy and homology (wings of birds and insects, forelimbs of bat and rabbit)
4. Serial homology in appendages of *Palaemon*.

Animal Behaviour

1. Study of habitat selection in the first and third instar larvae of *Drosophila melanogaster*
2. Habituation in earthworms/mosquito larvae.
3. Locomotory behaviour of dipteran larvae (Housefly/blowfly/fruitfly):
 - 3.1. Locomotion on different types of substrata (writing paper, plastic sheet and sand paper)
 - 3.2. Effects of light intensity and light quality on the rate of locomotion
4. Study of individual and social behavioural patterns of a troop of monkey
5. Study of interspecific association between cattle and egrets

BOTANY
401-Ecology

Credits: 2

1. Introduction to ecology.
2. Environment: Abiotic and biotic environment; plant adaptations in response to water, temperature and light.
3. Population ecology: Population characteristics; ecotypes and ecads.
4. IVI: life forms and biological spectrum.
5. Ecosystem ecology: Ecosystem structure (abiotic and biotic components, food chain, food web, ecological pyramids).
6. Ecological succession: Types and pattern.
7. Biogeographical regions of India.

402-Plant Physiology and Biochemistry

Credits: 2

1. Water relation of plants: Water potential, water absorption, loss of water.
2. Cell Membrane: Structure, transport/Ion Transport.
3. Mineral nutrition of plants: Role of micro-and macronutrients, symptoms of nutrient deficiency.
4. Photosynthesis: Structure of chloroplast, absorption of light, transfer of light energy, electron transport, photophosphorylation, C₃, C₄ and CAM pathways of carbon fixation, photorespiration.
5. Respiration: Structure of mitochondria, glycolysis, TCA cycle.
6. Nitrogen metabolism: Forms of nitrogen, assimilation of nitrate.
7. Protein Synthesis: Types of RNA, transcription, translation.
8. Enzymes: Classification, nomenclature, mechanism of action factors controlling enzyme activity.
9. Plant growth hormones: Physiological role of auxins, gibberellins, cytokinins, abscisic acid and ethylene.

Practical for Semester-IV
Practicals Based on Course- 401 & 402

Credits: 2



Recommended Books

1. Bharucha, E. (2005). Textbook of Environmental Studies for Undergraduate Courses, Universities Press (India) Private Limited.
2. Dutta, A.C. (2016). Botany for Degree Students, Oxford University Press.
3. Hopkins, W. G. (1995). Introduction to Plant Physiology, John Wiley & Sons Inc.
4. Jain, J.L., Jain, S. & Jain, N. (2008). Fundamentals of Biochemistry, New Delhi: S. Chand & Company Ltd.
5. Khitoliya, R. K. (2007). Environmental Pollution – Management and Control for Sustainable Development, New Delhi: S. Chand & Company Ltd.
6. Michael, S. (1996). Ecology, Oxford University Press.
7. Mishra, D. D. (2008). Fundamental Concepts in Environmental Studies, New Delhi: S. Chand & Company Ltd.
8. Odum, E. P. (1983). Basics of Ecology, Saunder's International Students Edition.
9. Pandey, B. P. (2007). Botany for Degree Students: Plant Physiology, Biochemistry, Biotechnology, Ecology and Utilization of Plants, New Delhi: S. Chand & Company Ltd.
10. Salisbury, F. B. & Ross, C. W. (1992). Plant Physiology, Wordsworth-Thomson Learning Inc.
11. Sharma, P. D. (1989). Elements of Ecology, Meerut: Rastogi Publications.
12. Taiz, L. & Zeiger, E. (1998). Plant Physiology (2nd Ed.), Sinauer Associates, Inc., Publishers.
13. Verma, P. S. & Agrawal, V. K. (2006), Genetics, New Delhi: S. Chand & Company Ltd.

STATISTICS

401- Applied Statistics

Credits: 2

Demographic Methods: Sources of demographic data, census, registration, ad hoc surveys, hospital records, demographic profiles of the Indian census.

Measurement of Mortality and Life Table: Crude death rate, Standardized death rates, Age-specific death rates, Infant Mortality rate, Death rate by cause, Complete life table and its main features, Uses of life table.

Measurement of Fertility: Crude birth rate, general fertility rate, age specific birth rate, total fertility rate, gross reproduction rate, net reproduction rate.

Index Numbers: Price relatives and quantity or volume relatives, Link and chain relatives composition of index numbers; Laspeyre's, Paasche's, Marshal Edgeworth's and Fisher's index numbers; chain base index number, tests for index number, cost of living index number.

Time Series Analysis: Economic time series, different components, illustration, additive and multiplicative models, determination of trend, seasonal and cyclical fluctuations.

Statistical process and product control: Quality of a product, need for quality control, basic concept of process control, process capability and product control, general theory of control charts, causes of variation in quality, control limits, sub grouping summary of out of control criteria. Charts for attributes: p chart, np chart, c-chart, V chart. Charts for variables: $\bar{X}$ ($\bar{X}$, R), ($\bar{X}$, σ) charts.

Recommended Books

1. Mukhopadhyay P. (1994): Applied Statistics, New Central Book Agency Pvt. Ltd., Calcutta.
2. Srivastava O.S. (1983): A Text Book of Demography, Vikas Publishing House, New Delhi.
3. Benjamin B. (1959): Health and Vital Statistics, Allen and Unwin.
4. Goon A.M., Gupta, M.K. and Das Gupta B. (1986): Fundamentals of Statistics, Vol. II, World Press Calcutta.
5. Duncan A.J. (1974): Quality Control and Industrial Statistics, IV Edition, Taraporewala and Sons.
6. Montgomery D.C. (1991): Introduction to the Statistical Quality Control, IInd Editions, John Wiley and Sons.
7. Brown R.G. (1963): Smoothing, Forecasting and Prediction of Discrete Time Series, Prentice Hall.
8. Chatfield C. (1980): The Analysis of Time Series, IInd Edition Chapman and Hall.

402-Statistical Inference and Decision Theory

Credits: 2

Parametric model, parameter, random sample and its likelihood, statistics and its sampling distribution.

Point estimation : properties of estimators, mean square and minimum mean square error estimator, unbiasedness and minimum variance unbiased estimator, Cramer-Rao lower bound, amount of information, consistency of estimators and sufficient conditions for consistency, relative efficiency of an estimator, asymptotic efficiency, sufficiency, factorization theorem (without proof), concept of complete sufficient statistics, Rao-Blackwell theorem.

Methods of estimation : moments, maximum likelihood, minimum chi-square, least square with examples, BAN and CAN estimators, point estimates of measures of location, dispersion, regression, correlation and other useful parameters.

Concepts of confidence interval and confidence coefficient, confidence intervals for the parameters of univariate normal, two independent normal distributions and exponential distributions.

Statistical hypotheses, critical region, size and power of a test, most powerful test, randomized and non-randomized test, Neyman Pearson lemma and its applications, uniformly most powerful unbiased test, power likelihood ratio test and its applications, functions of UMP with simple illustration.

Elements of decision problems: Loss function, risk function, estimation and testing viewed as decision problems. Bayes rule.

Recommended Books

1. Freund J.E. (2001): Mathematical Statistical, Prentice Hall of India.
2. Hogg R.V. and Craig A.T. (1978): Introduction of Mathematical Statistics, Fourth Edition, Collier Macmillon Publishers.
3. Mood A.M., Graybill E.A. and Bose D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.
4. Rao C.R. (1973): Linear Statistical Inference and its Applications, Revised Edition Wiley Eastern.
5. Rohtagi V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley and Sons.
6. Goon A.M., Gupta M.K. and Das Gupta B. (1980): An Outline of Statistical Theory, Vol. II, The World Press Publishers Pvt. Ltd, Calcutta.
7. Kale B.K. and Sinha S.K. : Life Testing and Reliability.



Practical for Semester-IV
Practicals Based on Course- 401 and 402

Credits: 2

1. CDR, STDR, CBR, Age specific death rates, life tables, GRR, NRR, Logistic curve and related practicals.
2. Laspeyre's, Passche's, Fisher's index numbers.
3. Problems related to trend, seasonal and cyclical fluctuations.
4. Charts: p , np , c , R , $(\bar{X}, R)$, $(\bar{X}, \sigma)$.
5. Practicals on moment, maximum likelihood, Minimum chi-square, least squares methods of estimation.
6. Testing of hypothesis for mean, variance, correlations etc.



Pedagogy Related
401- Action Research in Education

Marks-100 Credits-4

Objective – After taking this course, the student will be able to:

1. Explain the meaning and importance of action research with reference to Indian schools.
2. Use various steps involved in action research in a school.
3. Design and implement school based action research project.
4. Use Action research strategy for improving school practices.

Content

Unit-I: Meaning and types of research- fundamental, applied and action research, difference between traditional (fundamental and applied) research and action research.

Unit-II: Action research for improving class room and school based programmes: Illustrative example in specific areas for use of action research interventions in teaching, learning, co-scholastic areas and organizational climate of a school.

Unit-III: Procedure of designing action research: Selection of problem, Formulation of action hypotheses and developing a suitable design for testing of such hypotheses, Evaluation of results in action research and their use.

Unit-IV: Developing school based projects for action research; Format of a project and its implementation. Determining intervention based effects in terms of pre-post comparison: Precautions needed. Formulating an action research based report for the benefit of other practitioners.

Assignment

Study on any one environmental problem. The report on the study must include efforts of the pupil teacher in developing awareness among people about that environmental problems.

Transactional Strategies

The course will be transacted through lecture-cum-demonstration sessions with major segment of the course devoted to formulation, implementation and evaluation of action research interventions relevant for a secondary school. The course transaction will also include group- discussions, brainstorming and interactive sessions.



Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be credited on the basis of evaluation of sessional work.

Readings

1. Best, John W. (1998), Research in Education, Prentice Hall of India, New Delhi.
2. Cohen, L. and Manion, L.(1980), Research Methods in Education, Croom Helm London.
3. Koul, L. (1984), Methodology of Educational Research, Vikas Publishing House, New Delhi.
4. Pandey, K. P. (2010), Action Research in Education, Vinod Pustak Mandir, Agra.
5. Pandey, K.P. (2008), Fundamental of Educational Research, Vishwavidyalaya Prakashan, Varanasi.

402- Environmental Education

Marks-100 Credits-4

Objectives

The student-teachers will be able to:-

1. Understand the problems of environment and its use.
2. Acquire various skills in training the students about environmental education.

Contents

Unit-I: Information about Environmental Education

- (a) Concept of Environmental Education and Need of Environmental Education.
- (b) Objectives of Environmental Education at Secondary School Level.
- (c) Methodologies of Environmental Education.
- (d) Curriculum Development in Environmental Education.

Unit-II: Global Environmental Issues

- (a) Components of Environment.
- (b) Concept of healthy environment & efforts made in this direction.
- (c) Global Environment issues:
 - i. Conservation of environment: government commitment in national and international fields.
 - ii. Depletion of ozone layer.
 - iii. Global warming (greenhouse effect).

Unit-III: Pollution

Environmental Pollution: Various types of pollution and strategies for addressing them.

Unit-IV: Role of Schools and teachers in improving the quality of environment

- (a) What can schools do?
- (b) What can teachers do?
- (c) What are the various agencies with which schools can collaborate?
- (d) Environmental management at micro and macro level.

Assignment

Study on any one environmental problem. The report on the study must include efforts of the pupil teacher in developing awareness among people about the concerned environmental problems.



Transactional Strategies

The course will be transacted through lecture-cum-demonstration sessions with major segment of the course devoted to formulation, implementation and evaluation of action research interventions relevant for a secondary school. The course transaction will also include group- discussions, brainstorming and interactive sessions.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be credited on the basis of evaluation of sessional work.

Readings

1. Center, E.W. (1977), Environmental Impact Assessment, McGraw Hill Co., New York.
2. Fedron, E. (1980), Man and Nature, Progress Publishers, Moscow.
3. Gupta, V.K. (1998), Environmental Education, New Academic Publishing House, Jalandhar.
4. Kormondy, E. (1991), Concept of Ecology, Prentice Hall of India, New Delhi.
5. Odem, E.P. (1975), Ecology, Oxford and IBH Publishing Co., New Delhi.
6. Plamer, J. & Philips, N. (1994) The Handbook of Environmental Education, Routledge, London & New York.
7. Purdom, P.W. & Anderson, S.H. (1980), Environmental Science, Charles E. Merrill Publishing Co., Columbus.
8. Pandey, K.P., Bhardwaj and Pandey, Asha (2005), Environmental Education (Hindi), Vishwavidyalaya Prakashan, Varanasi.
9. Saxena, A.B. (1966), Education for the Environmental Concerns: Implications and Predices, Radha Publications, New Delhi.
10. Sharma, P.D. (1998), Environmental Biology, Rastogi & Co., Meerut.
11. Sharma, R.C., & Tan, M.C. (1990), Source Book of Environmental Education for Secondary School Teachers(ed); UNESCO, Bangkok.
12. UNESCO (1977), Trends in Environmental Education, UNESCO, Paris.



SEMESTER-V

PHYSICS 501- Mathematical Physics

Credits: 2

Matrices

Hermitian, orthogonal and unitary matrices, inverse of a matrix, similarity transformations, Eigenvalue problems and diagonalization of matrices (Examples: non-degenerate and degenerate cases).

Differential Equations

Second order homogeneous differential equations and their series solution (example: Bessel equation), linear independence of two solutions (Wronskian), Integral and power series methods for second solution.

Special Functions

Bessel, Legendre (spherical harmonics), Hermite and Laguerre: generating functions, orthonormality conditions, Dirac delta function.

Fourier Series

Recommended Books

1. Mathematical Methods for Physicists : Arfken and Weber.
2. Mathematical Physics: P.K. Chattopadhyay.
3. Mathematical Methods in Physical Sciences : Boas.
4. Mathematics for Physicists and Engineers : Pipes.

502- Solid State Physics

Credits: 2

Structure and Symmetry:

Elements of external symmetry of crystals, space lattice, Bravais lattices, Miller indices for direction and planes, Common crystal structures: NaCl, CsCl, ZnS and Diamond, Close packed structures.

Bonding in solids, Lennard Jones potential, concept of cohesive energy, covalent, van der Waals, ionic and metallic bonding.

Diffraction of x-rays, Laue equations and Braggs law, reciprocal lattice, Brillouin Zones and Ewald construction, atomic scattering and structure factors.



Lattice Vibrations

Vibrational modes of continuous medium, Debye's theory of specific heat, Vibrations of one dimensional monoatomic and diatomic chain, Phonons, Density of states.

Electronic Properties

Free electron gas, Electrons in periodic potential, Kronig Penny model, Bloch theorem, energy bands, metals, insulators and semiconductors.

Magnetic Properties

Dia-, Para-and Ferromagnetism, origin of magnetism, Langevin's theory of paramagnetism, Weiss Molecular theory, Ferromagnetic ordering, spin waves, magnons, ferromagnetic domains.

Recommended Books

1. Crystalloraphy for Solid State Physics: A.R. Verma and O.N. Srivastava.
2. Introduction to Solids : R.P. Singhal.
3. Solids State Physics : Kittel.
4. Solids State Physics: Ashcroft and Mermin.
5. Solids State Physics : Decker.

Practical for Semester-V

Credits: 2

1. Magnetic susceptibility of nickel ion.
2. Half-life of Indium¹¹⁶.
3. Determination of Cauchy's constant.
4. Prism Spectrograph.
5. Wavelength of laser and thickness of wire.



CHEMISTRY
501- Analytical Chemistry-I

Credits: 2

1. **Statistical Evaluation:** Determinant and indeterminant errors, Normal error curve, Accuracy and Precision, Relative and standard deviation, Methods for minimizing errors, Criteria for rejection of observation, Significant figures and computation rules, Error propagation.
2. **Precipitation:** Desirable properties of gravimetric precipitates, Formation of gravimetric precipitates, Conditions for quantitative precipitations, Contamination in precipitates, Method for removal of impurities in precipitates, Steps involved in quantitative precipitation, Organic precipitants (oxine, dithizone, α -nitroso-(naphthol, cupferon, dimethyl glyoxime) in chemical analysis.
3. **Analytical Reagents:** Theoretical and practical aspects of the use of EDTA, cerate, iodate, bromate, chloramine-T, Karl Fischer and periodate reagents in chemical analysis.
4. **Environmental Pollution:** Terminology used in environmental chemistry, Atmospheric pollution, Source of air pollution, Global warming, Ozone-hole, Auto exhaust emissions and its prevention, Air quality parameters, Acid rains, Industrial and domestic effluents, Treatment plants, Fluoresis, Arsenic, Mercury and Methylisocyanate (MIC) poisonings, Current environmental issues in the national context and remedial measures.

Recommended Books

1. 'Modern Methods of Chemical Analysis', R.L. Pecscock, L.D. Shields, T. Cairns and I.C. Mc William, 2nd Edition (1976), John Wiley, New York.
2. 'Basic Concepts of Analytical Chemistry', S.M. Khopkar, 2nd Edition (1998), New Age International Publications, New Delhi.
3. 'Analytical Chemistry', G.D. Christian, John Wiley and Sons, New York (2001).
4. 'Environmental Chemistry', A.K. De, 3rd Edition (1994), Wiley Eastern, New Delhi.

502- Inorganic Chemistry-III

Credits: 2

1. **Theories of Metal-Ligand bonding:** Limitations of valence bond theory; Crystal-field theory and crystal-field splitting in octahedral, tetrahedral and square planar complexes. Jahn-Teller Distortion. Factors affecting the crystal- field splitting.
2. **Thermodynamic and Kinetic aspects of Metal Complexes:** A brief outline of thermodynamic and kinetic stabilities of metal complexes and factors affecting the stability. Substitution reactions of square-planar complexes – Trans effect.
3. **Organometallic Chemistry:** Definition, nomenclature and classification of organometallic compounds. Preparation, properties, bonding and applications of alkyl and aryls of Li, Al, Hg, Sn, Ti. A brief account of metal-ethylenic complexes and homogeneous hydrogenation.
4. **Lanthanides:** Comparative study of lanthanide elements with respect to electronic configuration atomic and ionic radii, oxidation state and complex formation, lanthanide contraction. Separation of lanthanides. Application of lanthanide complexes.

Practical for Semester-V

Credits: 2

Preparations (Organic and Inorganic)

1. **Preparation of Organic Compounds:**
 - (i) m-dinitrobenzene, (ii) Acetanilide, (iii) Bromoacetanilide, (iv) Oxidation of primary alcohols-Benzoic acid from benzylalcohol, (v) azo dye
2. **Preparation of Inorganic Compounds:**
 - (i) Potassium trioxalato chromate (III); (ii) $\text{CoHg}(\text{SCN})_4$; (iii) Cu(I) thiourea complex (iv) Bis (2, 4-pentanedionate) zinc hydrate; (v) Double salts (Chromic alum/Mohr's salt)



Recommended Books

1. '*Concise Inorganic Chemistry*', J.D. Lee, 5th Edition (1996), Chapman & Hall, London.
2. '*Inorganic Chemistry*', J.E. Huheey, E.A. Keiter and R.L. Keiter.
3. '*Modern Inorganic Chemistry*', R.C. Aggarwal, 1st Edition (1987), Kitab Mahal, Allahabad.
4. '*Basic Inorganic Chemistry*', F.A. Cotton, G. Wilkinson and Paul L. Gaus, 3rd Edition (1995), John Wiley & Sons, New York.
5. '*Inorganic Chemistry*', A.G. Sharpe, 3rd International Student Edition (1999), ELBS/ Longman, U.K.
6. '*Inorganic Chemistry*', D.F. Shriver and P.W. Atkins, 3rd Edition (1999), ELBS, London.

MATHEMATICS

501- Analysis-I

Credits: 2

Riemann Integral, Integrability of continuous and monotonic functions, Fundamental theorems of integral calculus, Mean Value theorems of integral calculus.

Improper integrals and their convergence. Comparison test, Abel's and Dirichlet's test, Integral as a function of a parameter and its applications.

Sequences, Theorems on limits of sequences, Monotone convergence theorem, Cauchy's convergence criterion. Infinite series, series of non-negative terms. Comparison test, Ratio test, Rabbe's, logarithmic, De Morgan and Bertrand's tests. Alternating series, Leibnitz's theorem.

502- Differential Geometry

Credits: 2

Theory of space curves: Space curves, Planer curves, Serret-Frenet formulae. Osculating circles and spheres. Existence of space curves and evolutes and involutes.

Theory of surfaces: Parametric curves on surfaces. Direction coefficients. First and second Fundamental forms. Principal and Gaussian curvatures. Lines of curvature, Euler's theorem. Rodrigue's formula, Conjugate and Asymptotic lines. Developables, Developable associated with space curves, Developable associated with curves on surfaces. Minimal surfaces.

503-Discrete Mathematics

Credits: 2

Lattices and Boolean algebra: Logic: propositional and predicate. Lattices as partially ordered sets and as algebraic systems. Duality, Distributive, Complemented and complete lattices. Lattices and Boolean Algebra. Boolean functions and expressions. Application of Boolean algebra to switching circuits (using AND, OR and NOT gates)

Graphs and Planar Graphs: Graph, Multigraph, Weighted Graphs, Directed graphs. Paths and circuits. Matrix representation of graphs. Eulerian Paths and Circuits. Planar graphs.



Recommended Books

1. Shanti Narayan, A Course of Mathematical Analysis, S. Chand & Co., New Delhi.
2. T. M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
3. R.R. Goldberg, Real Analysis, Oxford & IBH Publishing Co., New Delhi, 1970.
4. S. Lang, Undergraduate Analysis, Springer-Verlag, New York, 1983.
5. P.K. Jain and S.K. Kaushik, An Introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
6. T.J. Willmore, An Introduction to Differential Geometry, Oxford University Press, 1965.
7. B.B. Sinha, Differential Geometry, An Introduction, Shyam Prakashan Mandir, Allahabad, 1978.
8. J.A. Thorpe, Introduction to Differential Geometry, Springer-Verlog.
9. M. Docarmo, Differential Geometry of Curves and Surfaces, Prentice-Hall, 1976.
10. C.E. Weatherburn, Differential Geometry of Three Dimensions, Cambridge University Press, 1955.
11. C.L. Liu, Elements of Discrete Mathematics (Second Edition), McGraw Hill, International Edition, 1986.
12. J. P. Tremblay, & R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw Hill Book Co., 1999.
13. S. Wiitala, Discrete Mathematics: A Unified Approach, McGraw Hill Book Co.
14. N. Deo, Graph Theory with Applications to Computer Science, Prentice Hall of India.

ZOOLOGY

501-Functional Anatomy and Economic Importance of Non-Chordates-I

Credits: 2

1. Protozoa

- 1.1. Study of *Euglena* and *Monocystis* (locomotion, nutrition and reproduction)
- 1.2. Parasitic protozoans of man: *Entamoeba*, *Giardia*, *Trypanosoma*, *Leishmania* (diagnostic characters, mode of infection and diseases caused)
- 1.3. Soil protozoa and their role in agriculture

2. Origin of Metazoans

- 2.1. Germ layers, diploblastic and triploblastic organization
- 2.2. Theories on the origin of Metazoans

3. Porifera

- 3.1. Study of *Leucosolenia* and *Sycon* (structure, skeleton and canal system)
- 3.2. Sponge culture and its importance in industry and commerce

4. Cnidaria and Ctenophora

- 4.1. Study of *Obelia* and *Aurelia* (structure and reproduction)
- 4.2. Salient features of ctenophores and comparisons with cnidarians
- 4.3. Coral reefs and coral in commerce and industry

5. Platyhelminthes

Fasciola and *Taenia*: structure, reproduction, life-cycle and parasitic adaptations

502-Functional Anatomy and Economic Importance of Non-Chordates-II

Credits: 2

1. Nematelminthes

- 1.1. *Ascaris*: structure, reproduction and life-cycle
- 1.2. Nematode parasites of man: *Ascaris*, *Ancylostoma* and *Wuchereria*: diagnostic characters, mode of infection and diseases caused.

2. Annelida

- 2.1. Nereis: structure with special reference to reproduction
- 2.2. Trochophore larva and its significance
- 2.3. Earthworms and soil improvement

3. Arthropoda

- 3.1. Palaeomon: structure with special reference to reproduction
- 3.2. Zoological importance of *Limulus*
- 3.3. Prawn culture and its economic importance

4. Mollusca

- 4.1. *Unio*: structure with special reference to reproduction
- 4.2. Torsion and detorsion in gastropods
- 4.3. Modification of foot in mollusks
- 4.4. Utility of mollusks in food and ornaments
- 4.5. Pearl culture

5. Echinodermata

- 5.1. Asterias: structure with special reference to water vascular system
- 5.2. Larval forms of Echinoderms and their significance

Recommended Books

- 1. Barnes : Invertebrate Zoology (4th ed. 1980, Holt- Saunders)
- 2. Barnes : The invertebrate (3rd ed. 2001, Blackwell)
- 3. Barrington : Invertebrate Structure and Function (1967, Nelson)
- 4. Moore : An introduction to the invertebrates (2001, Cambridge)
- 5. Ekambaranath Ayar : A manual of Zoology, Part-I- Invertebrata (1973, S. Vishwanathan)
- 6. Kotpal, Agrawal and Khetrapal : Modern Textbook of Zoology : Invertebrate (1976, Rostogi)
- 7. Marshall : Parker and Haswell Textbook of Zoology, Vol-I (7th ed. 1972, Macmillan)
- 8. Nigam : Biology of Non-chordates (1985, S. Chand)
- 9. Jordon and Verma : Invertebrate Zoology (1995, S. Chand)



Practical for Semester -V

Credits: 2

1. Protozoa

- 1.1. Survey of pond water for study of free living protozoans
- 1.2. Culturing of *Paramecium* and *Euglena* and observation of their locomotion

2. Porifera

- 2.1. Study of canal systems (asconoid, syconoid, leuconoid) from prepared slides and models
- 2.2. Mounting of spicules
- 2.3. Study of the following museum specimens: *Leucosolenia*, *Sycon*, *Euplectella*, *Hyalonema*, *Spongilla*, *Cliona*, *Euspongia*

3. Cnidaria

- 3.1. Study of the following through prepared slides: T.S. of *Hydra* through ovary and testis, *Scyphistoma* and *Ephyra*
- 3.2. Study of the following museum specimens: *Physalia*, *Porpita*, *Vellala*, *Aurelia*, *Tubipora*, *Corallium*, *Gorgonia*, *Pennatula*, *Metridium*, *Fungia*, *Millepora*.
- 3.3. Study of coral and coral reefs from chart and specimen

4. Ctenophora

Study of the following museum specimens: *Hormiphora*, *Pleurobranchia*, *Beroe*

5. Platyhelminthes

Study of the following from slides/specimen: *Dugesia*, *Polystoma*, *Schistosoma*, *Echinococcus*, *Fasciola*, *Taenia*, *Miracidium*, sporocyst, redia, cercaria, metacercaria, Hexacanth bladder worm

6. Nematelminthes

Study of the following from slide specimen: *Ascaris* (male and female) T.S. of *Ascaris*, *Wuchereria*, *Ancylostoma* and *Enterobius*

7. Annelida

7.1. Leech

- 7.1.1. External features
- 7.1.2. Dissections: Digestive, urinogenital and nervous systems
- 7.1.3. Mounting of jaws and salivary glands



- 7.2. *Nereis*: Permanent stained preparation of parapodium
- 7.3. Study of the following museum specimens/slides: *Nereis*, *Aphrodite*, *Arenicola*, *Sabella*, *Acanthobdella*, *Branchellion*, *Bonellia*
- 7.4. Trochophore Larva, T.S. of Leech through crop sac

8. Arthropoda

- 8.1. Scorpion
 - 8.1.1. External features
 - 8.1.2. Dissections: Digestive and nervous system
 - 8.1.3. Permanent preparation of book -lungs
- 8.2. Study of the following museum specimens/slides: *Daphnia*, *Cypris*, *Cyclops* (male and female) *Lepas*, *Balanus*, *Cancer*, *Julus*, *Scolopendra*, *Peripatus*, *Limulus* *Lepisma*, Cricket, beetle, grasshopper, termite, *Apis*, wasp, butterfly, moth.
- 8.3. Study of the following larval forms from slides: Nauplius, Zoea and Megalopa
- 8.4. Study of life cycle of silk worm from chart and model/specimen
- 8.5. Study of prawn culture from chart/model.

9. Mollusca

- 9.1. *Unio*
 - 9.1.1. Dissection of nervous system
 - 9.1.2. Stained preparation of gill lamella
- 9.2. Study of the following museum specimens: *Chiton*, *Cyprea*, *Patella*, *Aplysia*, *Doris*, *Vaginula*, *Achatina*, *Dentalium*, *Mytilus*, *Pecten*, *Teredo*, *Solen*, *Sepia*, *Loligo*, *Octopus*.
- 9.3. Study of pearl formation and its culture from chart/model

10. Echinodermata

- 10.1. Study of the following museum specimen: Star fish, brittle star, sea urchin, sea cucumber, sea lily
- 10.2. Study of the following larval form from slides: Bipinnaria, Brachiolaria, Auricularia, Ophiopluteus and Echinopluteus

BOTANY
501-Cryptogams - I

Credits: 2

1. Classification (Fritsch's system) of algae and general characteristics of major classes.
2. Pigmentation and storage products.
3. Thallus organization and evolutionary tendencies.
4. Reproduction and life history types with reference to Chlorophyceae, Phaeophyceae, Rhodophyceae and Cyanophyceae.
5. Economic importance of algae.
6. General features of fungi and their classification (Ainsworth's system).
7. Structure, reproduction and life cycle of representative classes of fungi.
8. Types of fungal spores and mode of their liberation.
9. Evolutionary trends in fungi.

502- Cryptogams - II

Credits: 2

1. Economic importance of fungi and Bryophytes.
2. General features and classification of Bryophyta.
3. Life histories of bryophytes with reference to *Riccia*, *Marchantia*, *Antnoceros*.
4. General account of evolution of sporophyte.
5. General features and contemporary system of classification of Pteridophyta.
6. Stelar Evolution in Pteridophyta.
7. Life histories of *Psilotum* and *Marselia*.
8. Fossil Bryophytes.

Practical for Semester-V
Practical Based on Course- 501 & 502

Credits:2



Recommended Books

1. Dutta, A.C. (2016). Botany for Degree Students, Oxford University Press.
2. Kumar, H.D. (1999). Introductory Phycology, Delhi: Affiliated East-West Press Pvt. Ltd.
3. Pandey, B. P. (2001). College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd.
4. Pandey, B. P. (2007). Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S. Chand & Company Ltd.
5. Sambamurthy, A. V. S. S. (2006). A Textbook of Algae, New Delhi: I. K. International Pvt. Ltd.
6. Thakur, A. K. & Bassi, S. K. (2008). A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd.
7. Vashishta, B. R., Sinha, A. K. & Singh, V. P. (2008). Botany for Degree Students: Algae. S. Chand & Company Ltd.
8. Watson, E. V. (1974). The structure and life of Bryophytes, New Delhi: B. I. Publications.
9. Parihar, N.S., Bryophytes, Central Book Depo Allahabad.

STATISTICS

501-Programming with C

Credits: 2

History and features of C language, components of C language, structure of a C program. Data type: Basic data types, enumerated data types, derived data types. Variable declaration, local, global, parametric variables, assignment of variables, numeric, character, real and string constants, arithmetic relation and logical operators, assignment operators, increment and decrement operators, conditional operators, Bitwise operators, type modifiers and expressions, writing and interpreting expressions, using expressions in statements. basic input /output.

Control Construct. I Control statements, conditional statements, if else, nesting of if..... else, elself ladder, switch statements. Loops in C: for, while, do while loops

Control Constructs II

Break, continue, exit (), go to and label declarations.

One dimensional two dimensional and multidimensional arrays.

Storage classes: Automatic variables, External variables, Static variables, Scope and lifetime of declarations.

Functions, classification of functions, functions definition and declaration, assessing a function, return statement, parameter passing in functions, revise on in Functions.

Pointers (concept only).

Structure: Definition and declaration; structure (initialization) comparison of structure variable array of structures : array within structures, structures within structures, passing structures to functions, unions accessing a union member, union of structure, initialization of a union variable, uses of union. Introduction to linked list, linear linked list, insertion of a node in list; removal of a node from list.

Files in C. Defining and opening a file, input - output operation con a file, creating a file, reading a file.

Recommended Books

1. Balagurusamy E. : Programming in ANSI C, Tata McGraw Hill.
2. Kanetkar Y.P. : Working with C, BPB Publication.
3. Gottfried Byron S. : Theory and problems of Programming with CTMH.
4. Schildt Herbest : C The Complete Reference III Edition, TMH.
5. Schildt Herbest : C Made Easy, McGraw Hill.



502-Operations Research

Credits: 2

Definitions and scope of operation research, different types of models in operations research – their construction and general method of solution.

Elements of linear programming problem (LPP): Canonical and standard forms, formulation of LPP, graphical method to solve two variable LPP, solution of LPP using simplex procedure, use of artificial variables in LPP, generation of extreme point solutions, principle of duality in LPP, statement and proof of duality theorem, simple problems based on duality theorem.

Allocation Models: Transportation problem (T.P.), different methods of finding initial feasible solution of a T.P., UV method of finding optimal solution of a T.P., solution of assignment problem using Hungarian method.

Inventory Control: Definitions of various costs involved in inventory control. Deterministic Economic Lot Size problems with and without shortages.

Theory of games: Two person zero-sum games, pure and mixed strategies, saddle point, maximinminimax principle of rectangular games, games without saddle point, dominance and modified dominance principles, graphical solution of $2 \times N$ and $M \times 2$ games, reduction of game problems to a L.P.P.

Recommended Books

1. Taha H.A. (1999): Operations Research, Macmillan Publishing Company.
2. Hiller F.S. and Libermann G.J. (1995): Introduction to Operations Research, McGraw Hill.
3. Hadley G. (1965): Linear Programming, Addison Wesley.
4. Gass G.I. (1958): Linear Programming- Methods and Applications, McGraw Hill.
5. McKinsey J.C.C. (1952): Introduction to the Theory and Games, McGraw Hill Book Co.
6. Kanti Swaroop, Gupta, P.K. and Singh M.M. (1985): Operations Research, Sultan Chand and Sons.

Practical for Semester-V Practicals Based on Course– 501 and 502

Credits: 2



Pedagogy Related
501: Educational Technology

Marks-100 Credits-4

Objectives

The student teachers will be able to:-

1. Develop a total perspective of the role of technology and information science in modern educational practices.
2. Make various technological applications available for improving instructional practices.
3. Acquire knowledge about different aspects of teaching and communication process.
4. Acquire information about innovation in Educational Technology.
5. Learn skills required for effective instruction.

Contents

Unit-I: Concept of Educational Technology and Information Technology

- (a) Concept, Nature and Scope of Educational Technology; Difference between Technology in Education and Technology of Education
- (b) Approaches of Educational Technology- Hardware, Software and System Approach.
- (c) Applications of Educational Technology in improving theory and practices of education.
- (d) Concept and significance of Information Technology.
- (e) Different types of network: LAN, WAN, E- mail, Internet and World Wide Web.

Unit-II: Teaching and Communication Technology

- (a) Meaning, principles, levels and phases of teaching.
- (b) Concept, process, principles and barriers of communication.
- (c) Classroom Communication (Verbal and Non- Verbal).
- (d) Systematic observation of classroom interaction: FIAC- encoding and decoding procedures.

Unit-III: Models of Teaching & Instructional Strategies

- (a) Concept, elements and needs of a teaching model.
- (b) Classification of Teaching Models, Glaser's basic teaching model, Bruner's concept attainment model.
- (c) Instructional Strategies- Group discussion, Brainstorming, Tutorial and Role Playing.

Unit-IV: Innovation in Educational Technology and Modification of Teaching Behavior

- (a) CAI, Teleconferencing and Language Laboratory.
- (b) Microteaching and Simulation.
- (c) Programmed learning: psychological basis, principles and types- linear, branching and mathematics.

Assignment

Preparation of a linear or branching type of programming as instructional material in the relevant teaching subject.

Transactional Strategies

The course content will be implemented through lectures, discussions, laboratory sessions, demonstrations and multimedia presentations.

Evaluation

The course content will be of 4 credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be awarded on the basis of sessional work.

Readings

1. Aian Cleary (1976), Educational Technology, Wiley & Sons, New Delhi.
2. Antani, H. (1997), Internet for Beginners, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
3. Bruce, Joyce and Marsha Weil (1992), Models of Teaching, Prentice Hall of India, New Delhi.
4. Curtin (1998), Information Technology in the Breaking Wave, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
5. Hota (1996), Communications, IGNOU, New Delhi.
6. Jain, V.K. (1997), Information Technology, BPB Publication, New Delhi.
7. Kumar, A and S.Goswami (1996), The Information Society, IGNOU, New Delhi.
8. Leon, Mathews (1996), Internet for Everyone, Leon Teach Work Publication, Chennai.
9. O Shea T. and Selt J. (1983), Learning and Teaching with Computers, The Harvest Press, Sussex.
10. Rao, V.K. (2005), Instructional Technology, A.P.H. Publishing, New Delhi.
11. Rojers, William (1984), Communication in Action, Rinehart and Winston, Holt.



12. Sinha, P.K.(1998), Computer Fundamentals, BPB Publications, New Delhi.
13. Yogendra K. Sharma (2004), Fundamental Aspect of Educational Technology, Kanishka Publishers, New Delhi.
14. Pandey, K.P.(2007), A First Course in Instructional Technology, Amitash Prakashan, Delhi.
15. Pandey, K.P. (2007), Technology of Programmed Instruction, Amitash Prakashan, Delhi.



SEMESTER VI

PHYSICS 601- Quantum Mechanics

Credits: 2

Limits of Classical Physics

Black body radiation (without derivation), Photoelectric effect, Compton Effect.

Wave Packets and Uncertainty Relation

de Broglie hypothesis, Wave-particle duality, Davisson-Germer experiment, Wave packets, Group velocity and phase velocity, Uncertainty principle, Complimentarity.

Wave Mechanics

Schrödinger equation, Physical interpretation of wave function, Probability current density and conservation of probability, Free particle wave function, Schroedinger equation in the presence of a potential, Linear operators, Hermitian operators, Observables, Eigenvalues and Eigenfunctions, Expectation values, Ehrenfest's theorem.

Application of Schrödinger Wave Equation

Particle in one dimensional Box, Square well, Rectangular potential barrier and tunnelling, Linear harmonic oscillator.

Recommended Books

1. Quantum Physics: S. Gasiorowicz.
2. Quantum Mechanics: B.H. Bransden and C.J. Joachain.
3. Quantum Physics of Atoms, Molecules, Nuclei and Solids: R. M. Eisberg and R. resnick.
4. Quantum Mechanics: V. Devanathan.
5. Quantum Mechanics: C.S. Chaddha.

602- Electronic Devices and Circuits

Credits: 2

Electronic Devices

Field effect transistors, I-V Characteristics of JFET and MOSFET, FET biasing, FET as an amplifier. Silicon controlled rectifier, I-V Characteristics, phase controlled rectifier. Unijunction transistor, I-V Characteristics, relaxation oscillator. Cathode ray oscilloscope, working of CRT, deflection sensitivity, time base and waveform display.



Analog Circuits

Hybrid parameter model of transistor, analysis of transistor amplifier (with and without R_S and R_L) using h- parameters, simplified hybrid model, brief idea about hybrid π model.

Single stage amplifier in CE, CB and CC modes. RC coupled CE amplifier and its frequency response, tuned voltage amplifier. Power amplifier classification, distortion and efficiency, push pull amplifier, Feedback in amplifiers, positive and negative feedback, effect of negative feedback on the characteristics of different types of amplifiers, voltage and current series feedback circuits.

Barkhausen criterion of oscillations, tuned collector oscillator, Hartley/Colpitt oscillator, phase shift oscillator and multivibrators.

Need and types of modulation, amplitude modulation, analysis of A.M. wave, modulator and demodulator circuits.

Digital Circuits

Boolean algebra, logic gates, NAND and NOR gates as universal gates. Simplification of Boolean expressions using K- maps. Half and full adders and subtractors.

Recommended Books

1. Electronics Fundamental and Application : Chattopadhyay and Rakshit.
2. Principle of Digital Electronics : Malvino and Leach.
3. A Text Book of Electronics: Kakani and Bhandari.
4. Electronic Devices: T.L. Floyd.
5. Integrated Electronics : Millman and Halkias.

Practical for Semester-VI

Credits: 2

1. Experiment on logic gates- Verification of laws of Boolean algebra.
2. Transient response of LCR circuit and determination of quality factor.
3. Experiment of negative feedback amplifier.
4. Power supply and filter characteristics.
5. Design of Zener regulated power supply.
6. Experiment on Fourier analysis.



CHEMISTRY
601- Organic Chemistry-III

Credits: 2

1. **Alcohols:** Comparative study of substitution, dehydration, oxidation, and esterification of primary, secondary and tertiary alcohols.
2. **Isotope Effect in a Reaction:** Isotopic substitution in a molecule, primary and secondary kinetic isotope effects, solvent isotopic effect and their importance in mechanistic studies.
3. **Stereochemistry:** Concept of Chirality; symmetry element, symmetry operations. Enantiomers, diastereomers, racemates, racemisation, resolution, Pro-chirality, pro- stereoisomerism with suitable examples of one and two chiral centers. Regioselective, chemoselective and stereoselective reactions. Asymmetric induction, Cram's Rule: Addition of nucleophile to carbonyl function; Aldol condensation (*achiral-achiral*). Wilkinson's hydrogenation.
Fischer, Saw-horse and Newman projection formulae, Chirality- optical activity, enantiomersim and diastereoisomerism involving one and two chiral centres. Configuration; D/L, erythrose, threose and R/S nomenclatures. Geometrical isomerism and E/Z nomenclatures. Conformations of n-butane.
4. **Photochemistry:** Principles of photochemistry, photochemical reactions of carbonyl compounds and olefins.
5. **Heterocyclic Compounds:** Synthesis and chemistry of furan, pyrrole, pyridine, Indole and Quinoline.

Recommended Books

1. *Organic Chemistry*, I.L. Finar, Vol. I and II, 5th Edition (1975), Reprinted in 1996, ELBS and Longman Ltd., New Delhi.
2. *Stereochemistry of Organic Compounds*, D. Nasipuri, 2nd Edition (1994), Wiley Eastern Ltd., New Delhi.
3. *Stereochemistry of Organic Compounds*, E.L. Eliel, S.H. Wilen and Mander, Wiley Interscience, New York (2004).

4. *Organic Chemistry*, J. Clayden, N. Greeves, S. Warren and E. Wothers, Oxford Univ. Press, Oxford (2001).
5. *A Guide Book to Mechanism in Organic Chemistry*, Peter Sykes, 6th Edition (1997), Orient Longman Ltd., New Delhi.
6. *Organic Chemistry*, R.T. Morrison and R.N. Boyd, 6th Edition (2003), Prentice-Hall of India (P) Ltd., New Delhi.
7. *Heterocyclic Chemistry: Syntheses Reactions and Mechanisms*, R.K. Bansal, 3rd Edition (1999), New Age International, Publisher, New Delhi.
8. *Photochemistry and Pericyclic Reactions*, Jagdamba Singh and Jaya Singh, 2nd Edition, New Age International (P) Ltd. Publishers, New Delhi.

602- Physical Chemistry-III

Credits: 2

1. **Solid State:** Crystal lattices, space lattice, unit cell, crystal systems, law of rational indices, Miller indices, crystals and x-rays (the Braggs equation). Crystal structure of NaCl, graphite, and diamond. Types of crystal (molecular, covalent, metallic, ionic). Imperfection in crystals: point defect-Schottky and Frankel defects.
2. **Surface and Photochemistry:** Gibbs Adsorption isotherm. Multi layer adsorption- BET equation (no derivation) and its application to surface area measurement Heterogeneous catalysis (surface reactions): kinetics of unimolecular surface reactions- inhibition and activation energy. Nature of surface. Kinetics of enzymatic reactions: Michaelis-Menten equation, effect of temperature and pH. Law of photochemical equivalence, quantum efficiency, reasons for low and high quantum efficiency. Kinetics of photochemical reaction ($\text{H}_2 + \text{Br}_2 = \text{HBr}$), photostationary state, Chemical actinometers (uranyl oxalate).
3. **Thermodynamics of Solutions:** Chemical potential of a mixture of ideal gases. Chemical potential of real gases and fugacity, activity and activity coefficient (concept and physical significance), reference and standard states. Variation of fugacity with temperature and pressure, Lewis-Randall rule, thermodynamic functions of mixing (ΔG_{mix} , ΔS_{mix} , ΔV_{mix} , ΔH_{mix}),

ideal solutions and their characteristic properties, Duhem-Margules equation and its application, Henry and Raoult's laws. Thermodynamics of colligative properties: Freezing point depression, elevation of boiling point, osmotic pressure. van't Hoff equation. Measurement of osmotic pressure and determination of molecular weight of macromolecules.

4. **Electrochemistry:** Theory of strong electrolytes: - Qualitative idea of Debye- Huckel theory of ion-ion interactions, Debye-Huckel limiting law for activity coefficient of ions in electrolyte solution (derivation not required), its modification for concentrated solutions. Debye-Huckel-Onsager (D-H-O) theory of electrolytic conductance: qualitative idea of electrophoretic and relaxation effects, D-H-O equation for conductance of electrolyte solutions, effect of high frequency and high field on conductance.
5. **Quantum Mechanics of Simple Systems:** *Schrodinger's wave equation. Eigen functions and Eigen values and quantum mechanical operators. Expectation value of a physical quantity. Orthogonality of wave functions. The particle in a one dimensional box problem and its solutions. Particle in a three dimensional box. Degeneracy. Rigid rotor and Harmonic Oscillator.*

Practical for Semester- VI

Credits: 2

Inorganic Chemistry Practical

1. Chromatographic separation of metal ions.
2. Gravimetric estimation of Cations/Anions.

Recommended Books

1. *Physical Chemistry*, P.C. Rakshit, 5th Edition (1988), 4th Reprint (1997), Sarat Book House, Calcutta.
2. *Physical Chemistry*, K.J. Laidler and J.M. Meiser, 3rd Edition (International Edition, 1999), Houghton Mifflin Comp., New York.
3. *Physical Chemistry*, I.N. Levine, 4th Edition (International Edition, 1995), McGraw-Hill Inc., New York.
4. *Essentials of Nuclear Chemistry*, H.J. Arnikaar, 4th Edition (1995), New Age International (p) Ltd., Wiley Eastern Ltd., New Delhi.

MATHEMATICS

601- Computational Mathematics Lab-1

Credits: 2

The student is expected to familiarize with popular software's for numerical computation. Real life problems requiring knowledge of numerical algorithms for linear and nonlinear algebraic equations, eigen value problems/writing computer program in a programming language. To this end software's like MATLAB, MATHEMATICA, MAPLE can be adopted with following course outline.

- 1- Plotting of functions.
- 2- Matrix operations, vector and matrix manipulations, matrix computation and its applications.
- 3- Data analysis and curve fitting.
- 4- Solution of equations.
- 5- 2-D Graphics and 3-D Graphics- general purpose graphics functions, colour maps and colour controls.
- 6- Examples: Number theory.

602- Analysis-II

Credits: 2

Complex Analysis: Analytic functions, Harmonic functions, Elementary functions. Mapping by elementary functions, Mobius transformations, Conformal mappings. Metric spaces: Introduction. Neighbourhood, limit points, interior points, open and closed set, closure and interior, boundary points. Subspace of a metric space, Completeness. Cantor's intersection theorem. Construction of real numbers as the completion of the incomplete metric space of rationals. Dense subsets. Separable metric spaces. Continuous functions. Uniform continuity, Isometry and homeomorphism. Equivalent metrics.

603-Operations Research

Credits: 2

Linear Programming problem, Convexity, Simplex and Revised Simplex algorithm, Duality theory, Dual simplex. Transportation, Assignment and Traveling Salesman problems. Portfolio Theory, Principle of Optimality and its applications.



Recommended Books

1. MATLAB- High performance numeric computation and visualization software: User's Guide.
2. MATHEMATICA- Stephen Wolfram, Cambridge.
3. Shanti Narayan, Theory of Functions of a complex variable, S. Chand & Co. New Delhi.
4. E.T. Copson, Metric Spaces, Cambridge University Press, 1968.
5. R.V. Churchill & J.W. Brown, Complex Variables and Applications, 5th Edition, McGraw Hill, New York, 1990.
6. Mark J., Ablowitz & A.S. Fokas, Complex Variables: Introduction and Applications, Cambridge University Press, South Asian Edition, 1998.
7. P.K. Jain and K. Ahmad, Metric Spaces, Narosa Publishing House, New Delhi, 1996.
8. G. Hadley, Linear Programming, Narosa Publishing House, New Delhi, 1995.
9. S.I. Gass, Linear Programming: Methods and Applications (4th edition) McGraw Hill, New York, 1975.
10. Kanti Swaroop, P.K. Gupta and Man Mohan, Operations Research, Sultan Chand Sons, New Delhi, 1998.
11. Hamdy A. Taha, Operations Research, Prentice Hall of India, 1997.

ZOOLOGY

601-Mammalian Endocrinology and Developmental Biology

Credits: 2

- 1. Classification of chemical messengers**
 - 1.1. Hormones
 - 1.2. Neurohormones and neurotransmitters
 - 1.3. Pheromones
- 2. General mechanism of hormone action**
- 3. Hypothalamo-hypophyseal system**
 - 3.1. Structure of the hypothalamo-hypophyseal system
 - 3.2. Neurohypophyseal hormones – oxytocin and vasopressin
 - 3.3. Hormones of the adenohypophysis
 - 3.4. Hypothalamic control of adenohypophysis
- 4. Biosynthesis, Biological actions and regulation of secretion of hormones of following glands**
 - 4.1. Thyroid
 - 4.2. Adrenal
 - 4.3. Endocrine pancreas
 - 4.4. Testis
 - 4.5. Ovary
 - 4.6. Pineal
- 5. Gastrointestinal hormones (gastrin, CCK, secretin and motilin)**
- 6. Hormonal dysfunctions and diseases**
 - 6.1. Dwarfism and acromegaly
 - 6.2. Goiter
 - 6.3. Addison's disease
 - 6.4. Diabetes mellitus
- 7. Mechanism of fertilization**
- 8. Cleavage, gastrulation and fate map**
 - 8.1. Comparison of cleavage in sea urchin, frog and chick
 - 8.2. Comparison of fate map of sea urchin, frog and chick
 - 8.3. Comparison of gastrulation in sea urchin, frog and chick



9. Determination and differentiation

- 9.1. Morphogenetic gradients in sea urchin egg
- 9.2. Mechanism of axis determination in amphibians and functions of the organizers

10. Embryonic stem cells

Recommended Books

Endocrinology

1. Hadley : Endocrinology (5th ed. 2000, Prentice Hall)
2. Turner and Bagnara : General Endocrinology (6th ed. 1984, Saunders)

Developmental Biology

1. Alberts et al : Molecular Biology of the Cell (5th ed. 2008, Garland)
2. Balinsky : An Introduction to Embryology (1981, CBS)
3. Gilbert : Developmental Biology (8th ed. 2006, Sinauer)
4. Wolpert : Principles of Development (3rd ed. 2007, Oxford)

602-Mammalian Physiology

Credits: 2

1. Respiration

- 1.1. Mechanism and regulation of breathing
- 1.2. Transport of oxygen and carbon dioxide
- 1.3. Respiratory quotient

2. Circulation

- 2.1. Buffer system in blood
- 2.2. Blood groups
- 2.3. Cardiac cycle and its regulation
- 2.4. Haemostasis

3. Nutrition and Digestion

- 3.1. Balanced diet
- 3.2. Digestion and absorption of carbohydrates, proteins and fats

4. Excretion

- 4.1. Nephron
- 4.2. Urine formation
- 4.3. Hormonal control of renal function



5. Nervous System

- 5.1. Myelinated and non-myelinated nerve fibres
- 5.2. Resting and action potential
- 5.3. Initiation and conduction of nerve impulse
- 5.4. Types of synapses and chemical transmission

6. Muscles

- 6.1. Types and functional diversity
- 6.2. Ultrastructure of skeletal muscle
- 6.3. Muscle proteins
- 6.4. Chemistry of muscle contraction
- 6.5. Elementary knowledge of muscle twitch, tetanus and fatigue, isotonic and isometric contractions

Recommended Books

1. Ganong : Review of Medical Physiology (22nd ed. 2005, Lange Medical)
2. Guyton and Hall : A text book of Medical Physiology (11th ed. 2006, Saunders)
3. Keele and Neil : Samson Wright's Applied Physiology (13th ed. 1989, Oxford)

Practical for Semester-VI

Credits: 2

Part-A: Mammalian Endocrinology (Animal Model- Albino Rat)

1. Survey of endocrine glands and accessory sex organs
2. Study of estrous cycle by vaginal smear preparation
3. Surgical Techniques
 - 3.1. Ovariectomy
 - 3.2. Orchidectomy
 - 3.3. Adrenalectomy
4. Study of effects of orchidectomy/ovariectomy and replacement therapy on the seminal vesicle /uterus
5. Study of histological slides of the following :
 - 5.1. Pituitary
 - 5.2. Thyroid
 - 5.3. Endocrine pancreas



- 5.4. Adrenal
- 5.5. Testis
- 5.6. Ovary
- 5.7. Uterus
- 5.8. Seminal vesicle

Part -B : Developmental Biology

- 1. Frog embryology
 - 1.1. Collection of spawn and identification of stages
 - 1.2. Study of developmental stages
- 2. Demonstration of early developmental stages of a freshwater snail
- 3. Permanent preparation of whole mounts of chick embryos of 24-33, 36-48 and 48-72 hrs
- 4. Window preparation on fertilized egg to study development of chick embryo
- 5. Study of development of chick embryo from permanent slides of section through following regions
 - 5.1. Pharynx
 - 5.2. Heart
 - 5.3. Trunk

Mammalian Physiology

- 2. Counting of red blood corpuscles
- 3. Counting of white blood corpuscles
- 4. Determination of haemoglobin content
- 5. Measurement of blood pressure using sphygmomanometer
- 6. Determination of oxygen consumption (cockroach)
- 7. Demonstration of heart beat using kymograph showing auriculo-ventricular contraction and frequency (frog)
- 8. Demonstration of muscle contraction with the help of kymograph showing Twitch, clonus, tetanus and fatigue (frog)

BOTANY
601- Plant Ecology

Credits: 2

1. Population: Patterns and concepts, population growth, mechanisms of population differentiation, Quadrats.
2. Community: Community characteristics and their analyses, species diversity, niche.
3. Ecosystem: Concept, components and organization; primary productivity and its measurement Energy flow Nutrient cycling within ecosystems (C, N and P).
4. Environmental Pollution: Water Pollution: Sources and kinds, impact of pollution on aquatic ecosystem, eutrophication of water bodies. Air Pollution: Sources and kinds, impact of air pollution on plants, acid rain, causes and effects. Soil Pollution: Sources and kinds, impact on plants and ecosystem.
5. Ecotoxicology: Concept of toxicity and its ecological implications, important toxicants, dose-response relationship, role of ecological factors in modifying toxicity, biomagnifications.

602- Plant Metabolism, Biochemistry and Biotechnology

Credits: 2

1. Biosynthesis of carbon compounds: Sucrose, Starch, Cellulose, Lipids.
2. Sulphur and phosphorus metabolism: Activation and assimilation of sulphur, energy-rich phosphorus compounds, ATP synthesis.
3. Nitrogen metabolism Biological nitrogen fixation: Mycorrhizae
4. Nucleic acids: Structure and properties of different forms of DNA and RNA, Z-DNA.
5. Protein structure and synthesis: protein synthesis- transcription (mRNA processing), translation (activation of amino acids, initiation, elongation, termination & release of peptides), post-translational modification of proteins.
6. Biotechnological tools and techniques: Cloning vectors recombinant DNA techniques, transgenic plants.

Practical for Semester-VI
Practical Based on Course- 601 & 602

Credits:2



STATISTICS

601-Numerical Methods

Credits: 2

Finite differences of different orders, Δ , E and D operators, factorial representation of a polynomial, separation of symbols, sub-division of intervals, differences of zero. Concept of interpolation and extrapolation: Newton Gregory's forward and backward interpolation formulae for equal intervals, divided differences and their properties, Newton's formula for divided difference, Lagrange's formula for unequal intervals, central difference formula due to Gauss, Stirling, Bessel, Laplace and Everett, concept of error terms in interpolation formula.

Inverse interpolation: Different methods of inverse interpolation.

Numerical differentiation.

Numerical Quadrature: trapezoidal rule, Simpson's one-third and three-eighth rules, Weddle's rule.

Summation of series: Series whose general term (i) is the first difference of a function (ii) is in geometric progression.

Numerical solutions of differential equations: Euler's method, Milne's method, Picard's method and Runge-Kutta method.

Recommended Books

1. Scarborough, J.B. : Numerical Mathematical Analysis, Oxford University, Press and Oxford Book Co.
2. Saxena H.C. : Calculus of finite Differences.
3. Freeman H.: Finite Differences for Actuarial Students, Cambridge University Press.
4. Aitkinson U. : Elementary Numerical Analysis.
5. Sastry S.S.: Introductory Methods of Numerical Analysis, Fourth Edition, Prentice Hall of India.
6. Kunz, K.S. : Numerical Analysis, McGraw Hill.



602- Elements of Stochastic Processes

Credits: 2

Definition and examples of stochastic process: classification of general stochastic processes into discrete/continuous time, discrete/continuous state spaces, types of stochastic processes elementary problems, random walk, gambler's ruin problem.

Markov chains: Definition and examples of Markov chain, transition probability matrix, classification of states, recurrence, simple problems, basic limit theorem of Markov Chain (statement only): stationary probability distribution, applications.

Continuous time Markov Chain: Poisson process and related inter-arrival time distribution, pure birth process, pure death process, birth and death process, problems.

Branching process: Definition and examples of discrete time branching process, probability generating function, mean and variance, probability of extinction problems.

Recommended Books

1. Karlin S. and Taylor H.M. (1995): A First Course in Stochastic Process, Academic Press.
2. Hoel P.G., Port S.C. and Stone C.J. (1991): Introduction to Stochastic Process, Universal Book Stall.
3. Parzen E. (1962): Stochastic Process, Holden-Day.
4. Cinlar E. (1975): Introduction to Stochastic Processes, Prentice Hall.
5. Adke S.R. and Manjunath S.M. (1984): An Introduction to Finite Markov Processes, Wiley Eastern.
6. Medli J. (1996): Stochastic Processes, New Age International (P) Ltd.
7. Ross S.M. (1983): Stochastic Process, John Wiley.
8. Taylor H.M. and Karlin S. (1999): Stochastic Modeling, Academic Press.

Practical for Semester-VI Practicals Based on Course- 601 and 602

Credits: 2



601- Practical (B.Ed.)

Marks-100 Credits-4

6. Micro Teaching- at least 8 skills. **25**
सूक्ष्म शिक्षण— कम से कम 8 कौशल।
7. Action Research Project- Based on School/Class/Community Problem. **20**
क्रियात्मक अनुसंधान योजना— विद्यालय/कक्षा/सामुदायिक समस्याओं पर आधारित।
8. Use of ICT and development of power point presentation (PPT) including improvisation of teaching aids. **20**
सूचना एवं सम्प्रेषण तकनालजी का अनुप्रयोग तथा पावर प्वाइंट प्रस्तुतियों का विकास जिसमें शिक्षण उपकरणों का निर्माण भी शामिल है।
9. Personality development with emphasis on- Communication skill including language use and improvement of speech. **15**
व्यक्तित्व विकास— सम्प्रेषण कौशल (भाषा प्रयोग एवं वाक् सुधार सहित) पर बल देते हुए।
10. Internship - I (4 weeks) **20**
School visit: primary/upper primary/secondary and preparation of status report about various facilities provided in the school.
विद्यालय भ्रमण : प्राथमिक/उच्च प्राथमिक/माध्यमिक विद्यालय एवं विद्यालयों में उपलब्ध विभिन्न संसाधनों की एक रिपोर्ट तैयार करना।

SEMESTER- VII

701- Pedagogy of School Subject – 1 विषय शिक्षण-1 100 Marks 4 Credits

PCM Group and BZC Group (Both) Science Teaching

702 - Pedagogy of School Subject – 2 विषय शिक्षण-2 100 Marks 4Credits

PCM Group Mathematics Teaching

BZC Group Biology Teaching

Practical (B.Ed.)

Internship -II (16 weeks) (School Attachment) 200 Marks 8 Credit

1. Participation in school chores such as prayers, assembly, organization of co-curricular activities etc. 10Marks

विद्यालयी क्रियाकलापों यथा प्रार्थना, दैनिक सभा एवं पाठ्यक्रम सहगामी क्रियाओं के आयोजन में प्रतिभाग।

2. Practice teaching-30 lesson each subject total 60 lesson, supervised by B.Ed. faculty. 80+80= 160Marks

शिक्षण अभ्यास- बी0एड0 पर्यवेक्षकों के निर्देशन में प्रत्येक विषय से 30 पाठ कुल 60 पाठ।

3. Community work 10Marks

सामुदायिक कार्य

4. Scouting and Guiding -Under the guidance of an authorized trainer with certificate. 10 Marks

स्काउटिंग एवं गाइडिंग- प्राधिकृत प्रशिक्षक के निर्देशन में प्रमाण पत्र सहित

5. Yoga Education – Under the guidance of a formally trained yoga expert with certification from the concerned institution. 10 Marks

योग शिक्षा- औपचारिक रूप में प्रशिक्षित योग विशेषज्ञ के निर्देशन में प्रमाण पत्र सहित।



701-Science Teaching

Objective- After studying this paper, the student will be able to:

1. Acquire knowledge about meaning, need, value & place of science teaching.
2. Understand the objectives of general science teaching.
3. Clarify different teaching methods & curriculum constructions.
4. Explain functioning of science lab & library.
5. Develop interest in scientific activities along with curricular activities.
6. Construct lesson plan based on different approach & models of teaching.

Unit- I -

A. A critical study of the content of science prescribed at school level and its pedagogic implications.

B. Science Teaching: Nature, Need and Scope and Its correlation with other subjects, Value of science in present day living and its place in curriculum, Objectives of science teaching: objectives at different levels, Revised Bloom's taxonomy, methods of writing instructional objectives in behavioural terms viz, mager's method and RCEM.

Unit- II -

A. Science teaching methods- Lecture method, Lecture-cum-demonstration method, Heuristiic method, Project method, Assignment method and Modern trends in science teaching viz-e-learning, Team teaching, integrated approach.

B. Teaching aids in science teaching- meaning, types, significance, qualities of a good teaching aid, self improvised apparatus and teaching aids, steps for effective use of audio-visual aids.

Unit- III -

A. Science laboratory: Organization and structure of science laboratory, administration, maintenance and safety measures in the lab and first aid kit, Science library: need & importance along with different activities of library.

B. Science lesson plan- meaning, characteristics, major steps involved in lesson planning, Format of lesson plan, Different type of lesson plan based on different approaches.



Unit- IV -

A. Evaluation in science: Construction of achievement test based on objectives type items and determination of its Reliability and Validity.

B. Co-curricular activities- science fair & exhibitions, science club excursion- visit to science museum & science park, concept mapping, constructivist approach in science teaching.

Practical work

1. Construction of low cost improvised apparatus.
2. Construction of a lesson plan based on constructivist approach.

Reference Books

1. Bloom, B.S. (1956): "Taxonomy of educational objectives", David Mackay Company, INC, New York.
2. NCERT: "Text Book of Science, NCERT, New Delhi.
3. Pareekh, A.M. (2001): "Lesson Planning in Indian School", R.C. of Education, Jaipur.
4. Rao, D.B. (1997): "Reflection on Scientific Attitude", Discovery Publishing House, New Delhi.
5. Singh, Satnam: Modern Methods of Teaching Science, Srishti Book Distributors New Delhi.
6. Singh, Uttam Kuma: Science Education, C.W. Nayak A.K.
7. Sood, J.K. (1999): "New Direction In Science Teaching", Kohli Publication, Chandigarh.
8. Yadav, M.S.: Modern method of teaching of science, Anmol publishers, New Delhi.

702-Biology Teaching

Objectives- After studying this paper, the student will be able to:

1. Acquire knowledge about Meaning, Scope & Need of Biology.
2. Understand objectives of Biology Teaching.
3. Clarify the Teaching methods and curriculum constructions.
4. Analyze learning outcomes in Biology from the points of view of behaviourism to constructivism.
5. Construct lesson plan on the basis of different approaches & teaching models.
6. Develop interest in Biology laboratory work, bio club & botanical garden.

Unit-I -

A. A critical study of the content of biology prescribed at school level and its pedagogic implications.

B. Biology teaching: nature, need & scope its correlation with other subjects; Place of Biology in school curriculum, difference between curriculum and syllabus, Principles of curriculum constructions. Aims and objectives of biology teaching, methods and techniques of writing specific objectives in behavioural term. Revised bloom's taxonomy, difference between general & specific objectives.

Unit- II -

A. Methods of Biology teaching- lecture method, lecture-cum-demonstration method, problem solving method, heuristic method, project method & laboratory method. Modern trends in biology teaching- learning, team teaching, integrated method, discrepant event approach.

B. Biological laboratory- Need and significance of laboratory work, administration and safety measures in the lab and first aid kit, low cost improvised apparatus, maintenance of Biology laboratory. Biology library-need & importance.

Unit- III-

A. Learning in Biology- Constructivism vs Behaviourism, Meaning & difference between constructivist & behaviourist approach. Constructivist classroom, teacher and lesson. Concept mapping- meaning, definition & its significance.

B. Teaching Aids- meaning, type, significance & principles of the selection of proper teaching aids & their use. Co-curricular activities in Biology- visit to community

resources, botanical garden, aquarium, vivarium & terrarium and their construction, bio-club, eco-club.

Unit- IV -

A. Evaluation in Biology : Construction of achievement test based on objective type items and determination of its Reliability and Validity.

B. Lesson plan- characteristics, different approaches, major steps involved in lesson planning, format of lesson plan. Importance of lesson plan and different types of lesson plan based on different approaches.

Practical work -

1. Construction of an achievement test.
2. Construction of a lesson plan based on constructivist approach.
3. Essay writing on any innovation in Biology teaching & research.

Reference Books

1. Bhusan, S. : Biology teaching, Agarwal publication, Agra.
2. Bloom, B.S. : Taxonomy of educational objectives, David Mackey, New York.
3. Falk, Dons : Biology teaching method, Wiley New York.
4. Kulshrestha, S.P. : Teaching of Biology, Loyal book department. Meerut.
5. Kumar, S. : Biology Teaching, Agrawal Publication, Agra, 2010.
6. Ratho. T.N. : Emerging Trends in Biology teaching, Surya Prakashan, Meerut .
7. Ravi Kumar, S.K. : Teaching of Biology. Mangal deep Publishers, Meerut.
8. Singh, Satnam: Modern Methods of Teaching Zoology. Srishti Books Distributors. New Delhi.
9. Sood, J.K. : Teaching life sciences, Arya book depot, New Delhi.
10. Yadav.K. : Teaching of life science, Anmol publication, New Delhi.

702-Mathematics Teaching

Objective- After studying this paper, the student will be able to:

1. Know the place of mathematics in school curriculum and aims of mathematics teaching.
2. Use the teaching methods in mathematics teaching.

3. Prepare lesson plan of mathematics teaching.
4. Use the teaching aids in mathematics teaching.
5. Develop standardized achievement test in mathematics.

Unit-I-

A. A critical study of the content of mathematics prescribed at school level and its pedagogic implications.

B. Contribution of Great Mathematicians- Aryabhatta, Bhaskaracharya, Ramanujan, Gauss and Pythagoras, Place of mathematics in school curriculum, Correlation of mathematics with other subjects.

Unit-II-

A. Aims and objectives of mathematics teaching.

B. Curriculum of mathematics- concept and principles of curriculum construction.

Unit-III-

A. Methods used in mathematics teaching- Inductive-Deductive method, Analytic and Synthetic method, Lecture method, Heuristic method and Project method.

B. Using various techniques for teaching mathematics viz oral, written, drill and assignment or home work.

Unit-IV-

A. Lesson plan and teaching aids in mathematics teaching. Mathematics Library, Laboratory and club.

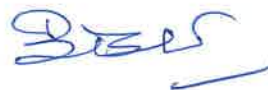
B. Evaluation in mathematics : Construction of achievement test based on objective type items and determination of its reliability and validity.

Practical work -

Preparing Unit- test based on Mathematics curriculum at school level and determining the difficulty level and discrimination power of items included in the test.

Reference Books-

1. Kumar, Sudhir & Ratnatikar, D.N.: Teaching of Mathematics, Anmol publication Pvt. Ltd., New Delhi.
2. Sidhu, Kulbir Singh: The Teaching of Mathematics. Sterling Publishers, New Delhi
3. Vashista, S.R.: Curriculum Construction, Anmol publication Pvt. Ltd., New Delhi.



SEMESTER- VIII

PHYSICS 801- Atomic Physics and Lasers

Credits: 2

Atomic Physics

Brief review of Bohr and Sommerfeld model of atom. Effect of finite nuclear mass in relation to Rydberg constant. Idea of discrete energy levels and electron spin: Franck – Hertz and Stern – Gerlach experiments.

Significance of four quantum numbers and concept of atomic orbitals. One valence electron atom: Orbital magnetic dipole moment, Orbital, spin and total angular momenta, Larmor precession, Vector model of atom, Electronic configuration and atomic states, Spin-orbit interaction and fine structure, Intensity of spectral lines, General selection rules. Zeeman Effect.

Two valence electron atoms: LS and JJ coupling schemes and resulting spectra. Idea of normal and inverted doublet.

Lasers

Purity of spectral line, coherence length and coherence time, spatial coherence of a source. Einstein coefficients, Threshold condition for LASER action, Rate equation for three level laser system, Characteristics of laser radiation. Ruby, He-Ne and Nd-YAG Laser.

Recommended Books

1. Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles : Robert Eisberg and Robert Resnick.
2. Introduction to Atomic Spectra : H.E. White.
3. Principles of Lasers : Orazio Svelto.

802- Statistical Mechanics

Credits: 2

Random Walk Problem

Probability distribution, calculation of mean and dispersion (as a measure of fluctuation), and simple numerical problems.

Basics of Statistical Mechanics

State of a system (Microscopic and Macroscopic); Phase space, density of states and Liouville's theorem; Postulates of statistical mechanics; Relation between statistical and thermodynamic parameters.

Classical Statistical Mechanics

Ensemble theory (Micro- canonical, Canonical and Grand-canonical), applications to classical ideal gas and simple numerical problems; Gibbs paradox; Statistical equivalence of three ensembles.

Quantum Statistical Mechanics

Introduction to Bose-Einstein and Fermi-Dirac statistics; Maxwell-Boltzmann statistics as a classical limit; Comparison of the three statistics.

Recommended Books

1. Fundamentals of Statistical and Thermal Physics: Frederick Reif.
2. Statistical Mechanics (2nd Edition) : R.K. Pathria.
3. Equilibrium Statistical Physics: Michael Plischke and Birger Bergersen.
4. Statistical Mechanics : (Wiley) : Kerson Huang.

CHEMISTRY

801- Analytical Chemistry-II and Inorganic Chemistry-IV

Credits: 2

1. **Radio-Analytical Methods:** Elementary theory, Isotope dilution and Neutron activation methods and applications.
2. **Spectrophotometry:** Beer's law and it's application, Nomenclature and units, General instrumentations for spectrophotometry, Spectrophotometric determinations of one Component (iron, chromoium, manganese, nickel, titanium and phosphorus) and two components (overlapping and non overlapping) systems, Spectrophotometric determination of dissociation constants of indicator, Photometric errors and RINGBOM-AYRES plots.
3. **Chemistry of f-block Elements:** Comparative study of actinide elements with respect to electronic configuration, atomic and ionic radii, oxidation states and complex formation; occurrence and principles of separation. General features and chemistry of actinides, principles of separation of Np, Pu and Am from U. Trans-Uranium elements.
4. **Bioinorganic Chemistry:** Essential and trace element in biological process, oxygen transport with reference to haemoglobin; synthetic models of O₂ carrieres. Biological role of alkali metals ions. Vitamin B-12.

802-Organic Chemistry-IV and Physical Chemistry-IV

Credits: 2

1. **Polymers:** Types of polymers and polymerization process: Addition, stereo controlled, step growth polymerizations. Radical, ionic and coordination mechanisms of polymerization. Synthesis and applications of following polymers: (i) Specialty Polymers: Conducting & Electroluminescent (Organic light emitting diodes), liquid crystals (ii) Natural and synthetic rubber (iii) Synthetic Fibers: Polyester, Polyamides (iv) Foaming Agent: Plasticizers (v) biodegradable polymers.
2. **Terpenes:** Occurrence, isolation, classification. Isoprene rule. Structure and synthesis of Citral and Geraniol.

3. **Dyes:** synthesis of malachite green, fluorescein. Synthesis and structure of Indigotin.
4. **Molecular Spectroscopy:** Region of electromagnetic spectrum. Emission and absorption spectra. Transition probabilities and selection rules. Width and intensity of spectral transitions Pure rotational spectra. Diatomic molecules Rigid rotor & non-rigid rotors. Vibrational, rotational spectra of diatomic molecules. Harmonic oscillator-rigid rotor approximation. Anharmonicity effect. Normal modes of vibration. Infrared spectra of linear and bent AB₂ molecules. Electronic spectra of diatomic molecules. Vibrational structure. Franck-Condon principle.
5. **Nuclear Magnetic Resonance Spectroscopy:** Nuclear Magnetic Resonance spectroscopy. Chemical shifts. Spin-spin splittings. Relaxation times.

Recommended Books

1. *Organic Chemistry*, I.L. Finar, Vol. II, 5th Edition (1975), Reprinted in 1996, ELBS and Longman Ltd., New Delhi.
2. *Organic Polymer Chemistry*, K.J. Saunders, 2nd Edition (1988), Chapman & Hall, London.
3. *Introduction to Synthetic Polymers*, Ian M. Campbell, 2nd Edition (2000), Oxford University Press, USA.
4. *Principles of Polymer Science*, P. Bahadur and N.V. Sastry, Narosa, New Delhi (2002).
5. *Principles of Medicinal Chemistry*, W.O. Foye, 3rd Edition (1989), Lea & Febiger/ Varghese Publishing House, Bombay.
6. *Medicinal Chemistry*, A. Kar, Wiley Eastern Ltd., New Delhi (1993).
7. *Physical Chemistry*, K.J. Laidler, and J.M. Meiser, 3rd Edition (International Edition 1999), Houghton Mifflin Comp., New York.
8. *Physical Chemistry*, I.N. Levine, 4th Edition (International Edition, 1995), McGraw-Hill Inc., New York.

MATHEMATICS

801- Number Theory

Credits: 2

Primes and factorization. Division algorithm. Congruence and modular arithmetic. Chinese remainder theorem. Euler phi function. Primitive roots of unity. Quadratic law of reciprocity, application. Arithmetical functions. Mobius inversion formula. The Diophantine equations $x^2 + y^2 = z^2$, $x^4 + y^4 = z^4$. Farey sequences.

802-Probability

Credits: 2

Notion of probability: Random experiment, sample space, axiom of probability, elementary properties of probability, equally likely outcome problems.

Random Variables: Concept, cumulative distribution function, discrete and continuous random variables, expectations, mean, variance, moment generating function.

Discrete random variables: Bernoulli random variable, binomial random variable, geometric random variable, Poisson random variable.

Continuous random variables: Uniform random variable, exponential random variable, Gamma random variable, normal random variable.

Conditional probability and conditional expectations, Baye's theorem, Independence, computing expectation by conditioning; some applications - a list model, a random graph, Polya's urn model.

Bivariate random variables: Joint distribution, joint and conditional distributions, the correlation coefficient.

Functions of random variables: Sum of random variables, the law of large numbers and central limit theorem, the approximation of distributions.

Uncertainty, information and entropy, conditional entropy, solution of certain logical problems by calculation information.



Recommended Books

1. David M. Burton, Elementary Number Theory, Wm. C. Brown Publishers, Dubuque, Iowa, 1989.
2. K. Ireland and M. Rosen, A Classical Introduction to Modern Number Theory, GTM Vol. 84, Springer-Verlag, 1972.
3. G.A. Jones and J.M. Jones, Elementary Number Theory, Springer-Verlag, 1998.
4. W. Sierpinski, Elementary Theory of Numbers, North-Holland, Ireland, 1988.
5. Niven, S.H. Zuckerman and L.H. Montgomery, An Introduction to the Theory of Numbers, John Wiley, 1991.
6. S.M. Ross, Introduction to Probability Models (Sixth edition), Academic Press, 1997.
7. Blake, An Introduction to Applied Probability, John Wiley & Sons, 1979.
8. J. Pitman, Probability, Narosa, 1993.
9. A.M. Yagolam and I.M. Yagolam, Probability and Information, Hindustan Publishing Corporation, Delhi, 1983.



ZOOLOGY

801-Functional Anatomy and Economic Importance of Chordates

Credits-2

- 1. Origin of vertebrates**
- 2. Integument and its derivatives**
 - 2.1. Structure of integument
 - 2.2. Scales, feathers, hair, beaks, claws, nails, hoofs, horns, antlers, glands
- 3. Endoskeleton**
 - 3.1. General plan of neurocranium and dermatocranium
 - 3.2. Jaw suspensorium
 - 3.3. Vertebrae
- 4. Digestive system**
 - 4.1. Modifications in relation to feeding habits
 - 4.1.1. Length and surface area
 - 4.1.2. Internal folds
 - 4.2. Supplementary diverticulae
 - 4.3. Oesophagus
 - 4.4. Stomach, its modification in ruminant mammals
 - 4.5. Dentition
 - 4.6. Dental formula in mammals
- 5. Respiratory system**
 - 5.1. Aquatic respiration
 - 5.2. Aerial respiration
 - 5.2.1. Accessory respiratory organs in fish
 - 5.2.2. Lungs
 - 5.2.3. Air-sacs in birds
- 6. Circulatory system**
 - 6.1. Aortic arches
 - 6.2. Portal systems
 - 6.3. Lymphatic system
- 7. Nervous system**
 - 7.1. Evolution of cerebral hemispheres and cerebellum
 - 7.2. Chemoreceptors
 - 7.3. Neuromast organs of lower vertebrates



8. Urinogenital system

8.1. Excretory system

8.1.1. Types and evolution of kidney tubules

8.1.2. Urinary duct and bladder

8.2. Reproductive system

8.2.1. General plan of gonads

8.2.2. Accessory reproductive organs

9. Economic importance

9.1. Fish industry and economy

9.1.1. Fish preservation

9.1.2. Fish by-products

9.2. Amphibians as biological control agent

9.3. Snake venom, its uses and antivenin production

9.4. Economic Importance of Birds

9.4.1. Pollination

Recommended Books

1. Hildebrand : Analysis of Vertebrate Structure (1995, John Wiley)
2. Kotpal : Modern Text Book of Zoology Vertebrates (2003, Rastogi)
3. Nigam : Biology of Chordates (1983, S. Chand)
4. Romer and Parsons : The Vertebrate Body (6th ed. 1986, Saunders)
5. Walter and Sayles : Biology of the Vertebrates (1959, Macmillan)
6. Young: The Life of Vertebrates (1981, Clarendon)
7. Young: The Life of Mammals (1975, Clarendon)



802-Immunology, Microbiology, Environmental Biology and Biotechniques

Credits-2

- 1. Introduction to immunity**
- 2. Cells and organs of immune system**
 - 2.1. Types of immune cells: lymphoid and myeloid
 - 2.2. Primary and secondary lymphoid organs and lymphatic system
- 3. Humoral immunity**
 - 3.1. Antigen
 - 3.2. Immunoglobulins: types, structure and function
 - 3.3. Generation and diversity of antibodies
 - 3.4. Complement system
- 4. Cell mediated immunity**
 - 4.1. Structural organization of MHC complex
 - 4.2. Antigen processing and presentation
 - 4.3. Functions of T-cells
- 5. Introduction to immunological disorders**
- 6. Introduction of Microbiology**
- 7. Microbial diversity**
 - 7.1. Viruses
 - 7.2. Archaea
 - 7.3. Bacteria
 - 7.4. Eukaryotic microorganisms
- 8. Techniques in microbiology**
 - 8.1. Culture and growth of microorganisms
 - 8.2. Classification of bacteria based on staining of microbes
- 9. Host-parasite relationship**
 - 9.1. Beneficial and harmful interactions of microbes with human
 - 9.2. Virulence factors and toxins
- 10. Applied microbiology**
 - 10.1. Useful microbial products: antibiotics, amino acids, bioinsecticides and biopolymers
 - 10.2. Biodegradation
 - 10.3. Diagnostic microbiology

11. Environmental Biology General concepts

- 11.1. Introduction to environmental biology
- 11.2. Major ecosystems of the world
- 11.3. Energy flow in ecosystem
- 11.4. Productivity, food chain and food web

12. Populations and communities

- 12.1. Population characteristics: density, natality, mortality and growth curve
- 12.2. Nature, structure and attributes of biological communities

13. Pollution

- 13.1. Sources and impact of environmental pollutants – air, water and soil
- 13.2. Global environmental changes – greenhouse gases and their effects

14. Natural resources

- 14.1. Soil, water, mineral resources and their conservation
- 14.2. Biodiversity – benefits, hotspots, threats and conservation
- 14.3. Human impact on natural resources

15. Biotechniques : Principles and uses of analytical instruments

- 15.1. pH meter
- 15.2. UV-visible spectrophotometer
- 15.3. Centrifuges (clinical, high-speed and ultra-centrifuge)
- 15.4. Geiger Muller and scintillation counters

16. Microtomy and Microscopy

- 16.1. Tissue preparation
 - 16.1.1. Fixation
 - 16.1.2. Block preparation
 - 16.1.3. Microtomy (paraffin and frozen tissue sectioning)
- 16.2. Types of Microscopes
 - 16.2.1. Bright field
 - 16.2.2. Dark-field
 - 16.2.3. Phase contrast
 - 16.2.4. Fluorescence
 - 16.2.5. Confocal
 - 16.2.6. Scanning and transmission electron microscopes

17. Cell and tissue culture techniques

- 17.1. Culture media
- 17.2. Sterilization: room, media and glasswares
- 17.3. Types of animal cell culture
- 17.4. Cell viability testing
- 17.5. Cryopreservation

18. Separation techniques

- 18.1. Chromatography
- 18.2. Electrophoresis

Recommended Books

Immunology

1. Abbas et al: Cellular and Molecular Immunology (2001, Saunders)
2. Alberts et al: Molecular Biology of the Cell (5th ed. 2008, Garland)
3. Kuby : Immunology (2003, Freeman)
4. Roitt & Delvis: Roitt's Essential Immunology (6th ed. 2006, Blackwell)

Microbiology

1. Madigan & Martinko: Brock Biology of Microorganisms (2006, Prentice Hall)
2. Prescott, Harley and Klein : Microbiology (1999, McGraw)

Environmental Biology

1. Cunningham and Cunningham : Environmental Science (2003, McGrawHill)
2. Odum : Fundamental of Ecology (1971, Saunders)
3. Raven, Berg and Jhonson : Environment (1993, Saunders)
4. Ricklefs : Ecology (1990, Freeman)
5. Sharma : Ecology and Environment (2003, Rastogi)
6. Turk and Turk : Environmental Science (1998, Saunders)

Biotechniques

1. Boyer: Modern Experimental Biochemistry (1993, Benjamin-Cummings)
2. Pearse : Histochemistry - Theoretical and applied, Volume I-III (1980-1993, Churchill-Livingstones)
3. Plummer : An Introduction to Practical Biochemistry (1989, McGraw Hill)
4. Wilson and Walker : Experimental Biochemistry (2006, Cambridge)



BOTANY
801-Cytogenetics and Evolution Process

Credits: 2

1. Chromosome structure: Physical architecture, chemical composition, ultra structural organization.
2. Chromosomal aberrations: Deletion, duplication, translocation and inversion.
3. Genomic Variations Aneuploidy: monosomics, trisomics, nullisomics, Polyploidy: autopolyploidy, allopolyploidy, segmental allopolyploidy, autoallopolyploidy.
4. Karyotype and its importance.
5. Linkage and crossing over, Gene mapping.
6. Multiple alleles and multiple factors.
7. Mutation and mutagens: Types of mutation, molecular basis of mutation, physical and chemical mutagens and mechanism of their action.
8. Hybridization and its role in evolution: Heterosis, theories of hybrid vigour, evolutionary significance.

802- Microbiology & Plant Pathology

Credits: 2

Section A: Microbiology

1. Introduction and scope of Microbiology.
2. General account of: *Methanococcus*, *Halobacterium*, *Agrobacterium*, *Mycoplasma* and *Thermoplasma*.
3. Growth of microorganisms in batch culture.

Section B: Plant Pathology

1. History and scope of plant pathology.
2. Modes of infection and physiology of parasitism.
3. Mechanisms of host-pathogen interactions.
4. Transmission and spread of plant diseases.
5. Methods of plant disease control.
6. Causal organism, symptoms, disease cycle and control measures of the following plant diseases: downy mildew of crucifers, rusts of linseed, smut of bajra, mosaic of sugarcane.



Recommended Books

1. Bhamrah, K. & Juneja, H.S.. Genetics and Evolution, New Delhi: Anmol Publication, Pvt. Ltd.
2. Devlin & Witham. Plant Physiology, New Delhi: CBS Publishers & Distributors.
3. Divan, P. Environ Protection, New Delhi: Deep & Deep Publications.
4. Grewal, R.C. Plant Physiology, New Delhi : Campus Brokes International.
5. Hill, M.K. (1997). Understanding Environmental Pollution, Cambridge University Press.
6. Jain V.K. Fundamentals of Plant Physiology, New Delhi: S. Chand & Company Ltd.
7. Kormondy, E.J. (1996). Concepts of Ecology, Prentice-Hall of India Pvt. Ltd.
8. Mackenzie, A. (1999). Instant Notes in Ecology, New Delhi: Viva Books Pvt. Ltd.
9. Odum, E.P. Ecology, Oxford & F.B.h. Publishing Co. Pvt. Ltd.
10. Pandey, B.P. Economic Botany Vol - I / II, New Delhi: Chand & Company Ltd.
11. Pandey, B.P. Modern Practical Botany Vol - I / II, New Delhi: Chand & Company Ltd.
12. Rastogi, V.A. text Book of Genetics, Meerut: Kedarnath Ramnath.
13. Ross, S. Plant Physiology, New Delhi: CBS, Publishers & Distributions.
14. Salisbury, F.B. & Ross, C.W. (1992). Plant Physiology (4th edition), California: Wadsworth Publishing Co.
15. Shukla, R.S. & Chandel, P.S. Plant Ecology, S. Chand & Company LTD.
16. Sundararajan, S. Physiology of Transport In Plants, New Delhi: Anmol Publications, Pvt. LTD.
17. Verma, P.S. / & Agrawal, V.K. Concept of Ecology, S. Chand & Lonpan Ltd.
18. Verma, V.. Text Book Of Plant Physiology, Delhi: Emkay Publications.
19. Winchester, A.M.. Genetics, Oxford and IBH, Publishing Co.

STATISTICS

801- Demand Analysis, Analysis of Income Distribution and Queuing Theory

Credits: 2

Theory and analysis of consumer's demand, law of demand, price elasticity of demand, estimation of demand curves, forms of demand functions, engel's curve, income elasticity of demand.

Analysis of income and allied distributions: Pareto distribution, graphical test, fitting of Pareto law, illustration, lognormal distribution and properties, Lorenz curve, Gini's coefficient.

Elements of queuing theory, characteristics of queues, Poisson process, distribution of inter-arrival time, definition of steady state condition $(M/M/1) : (\sim/FIFO)$ and $(M/M/1) : (N/FIFO)$ models, birth and death process $(M/M/K) : (\sim/FIFO)$ and $(M/M/K) : (N/FIFO)$ models.

Finite and infinite length models with associated distribution of queue length and waiting time, steady- state solutions of $(M/E_k/1)$ and $(E_k/1)$ queues, machine interface problem.

Recommended Books

1. Kanti Swaroop, Gupta P.K. and Singh M.M. (1985): Operations Research, Sultan Chand and Sons.
2. Hiller F.S. and Libermann G.J. (1995): Introduction to Operation Research, McGraw Hill.
3. Taha H.A. (1999): Operation Research, Macmillan Publishing Company.
4. Mukhopadhyay P. (1999): Applied Statistics, New Central Book Agency Pvt. Ltd., Calcutta.
5. Goon A.M., Gupta M.K. and Das Gupta B. (1986): Fundamentals of Statistics, Vol. II, World Press, Calcutta.
6. Croxton F.E. and Cowden D.F. : Applied General Statistics.
7. Asthana B.N. and Srivastava S.S. : Applied Statistics in India.

802-Reliability

Credits: 2

Life testing and reliability theory: Basic concepts of life testing experiments, reliability, hazard function and their relationship.

Elementary notion of censored data, type I and type II censoring schemes, Poisson process.

Parametric distributions: Weibull, gamma, lognormal, exponential as life time distributions, point and interval estimation procedures for the above distributions.

Testing reliability hypothesis for exponential and Weibull distributions.

System reliability concepts: Parallel system, series system and k out of n system.

Elementary idea of reliability models for non – maintained systems.

Recommended Books

1. Bain L. J. and Engelhardt M.: Statistical Analysis of Reliability and Life Testing Models, Marcel Dekker.
2. Zack S.: Introduction to Reliability Analysis: Probability Model and Statistical Methods, Springer Verlag.
3. Barlow R. E. and Proschan F.: Statistical Theory of Reliability and Life Testing: Probability Models, Holit Rinechart and Winston.
4. Gnedenko, Bylyayer and Solovyer: Mathematical Methods of Reliability Theory.
5. Kale B. K. and Sinha S. K.: Life Testing and Reliability.

Pedagogy Related

801 & 802- A: Human Rights, Non-Violence & Peace Education

Marks-100 Credits-4

Objectives

The student teachers will be able to:-

1. Develop an understanding and awareness of human rights, duties and co-existence of all living beings.
2. Prepare teachers to believe that alternative and less destructive measures tend to eradicate the social evils.
3. To help them to understand the methodology of behavioral modification through training in non-violence.
4. To enable the student teacher to identify and understand the role of peace education vis-a-vis the aim of transforming the prevalent society in a peaceful state.
5. To acquaint the student teachers with the various perspectives of environmental ethics and help them to reframe their life style for a harmonious relation with nature.

Contents

Unit-I: Human Rights: Issues and Perspectives

- (a) History of the idea of Human Rights.
- (b) Political, Civil, Economic, Social and Cultural Rights.
- (c) Indian perspective of Rights and Duties.
- (d) Problem of Violation of Human Rights: some emerging issues.

Unit-II: Non-violence

- (a) Conceptual development.
- (b) Vedic, Jain, Buddhist & Gandhian Tradition.
- (c) Non-violence in Practice-Respect for all living beings, cruelty against animals, Animal Rights and Non-violence
- (d) Non-violent Resistant methods and few examples of victory without violence.

Unit-III: Training in Non-violence

- (a) Conceptual development and necessity.
- (b) Change in Heart: Training of the Mind, Change in attitude: Training in open mindedness.
- (c) Change in life style: Training in life style modification and structural change: Training for change in the system.
- (d) Conflict & conflict Management.



Unit-IV: Peace Education

- (a) Concept of Peace and Peace Education.
- (b) Development of Peace Education.
- (c) Peace Education and Disarmament Education for a new world order.
- (d) Legitimacy and limitation of Peace Education.

Assignment

Preparing a Training programme and conducting a Training of Mind/Training in open mindedness / training in life style/ Training for change in the system.

Transactional Strategies

The course content will be transacted through interactive sessions, lectures, tutorials and demonstrations.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and 20 marks will be for evaluation which shall be done on the basis of sessional work.

Readings

1. Chitkara, M. G. (2003), Education and Human Values, A.P.H. Publishing Corporation, New Delhi.
2. Prashad, D. (1984), Peace Education and Education for Peace, G.P.F., New Delhi.
3. Doris, H. and Mullick, K. (1990), Non-violence: A Reader in the Ethics of Action, G.P.F., New Delhi.
4. Jawahar, L. K. (1998), Human Rights: Issues and Perspectives, Regency Publication, New Delhi.
5. Meyer, J. R. (1976), Reflections on Values Education, Wilfrid Laurier U. Press, Canada.
6. M. Raja (1998), Human Rights, Soorya Pathippakalm, Tiruchirapalli.
7. Talesra, H. L., N. Pancholy, and M.L. Nagda (2001), Human Rights Education (Edited), Regency Publication, New Delhi.
8. Talesra, H. L. and N. Pancholy (2003), Human Rights and Education (Hindi), Ankur Publication, Udaipur.
9. Venkataiah, N. (2004), Value Education, A.P.H. Publishing Corporation, New Delhi.
10. White, J. P. (1990), Education and the Good Life, Kogan Page, London.



801 & 802- B: Special Education

Marks-100 Credits-4

Objectives

The student teachers will be able to:-

1. Acquaint themselves with the need and characteristics of special children.
2. Gain the knowledge about identification and prevention of special children.
3. Understand various problems of special children.
4. Know about various educational remediations to be provided for special children.

Contents

Unit-I:

- (a) Concept, Nature, types and objectives of Special Education.
- (b) Education of Mentally Retarded: Concept, Characteristics, Teaching Strategies, Remedial Programme and Prevention of Mental Retardation.
- (c) Role of various regulatory bodies in special education with particular reference to RCI.

Unit-II:

- (a) Education of the Visually Impaired: Concept, Characteristics, Prevention and Educational Programmes for Visually Impaired.
- (b) Education of the Hearing Impaired: Concept, Characteristics, Prevention and Educational Programmes for Hearing Impaired.
- (c) Education of the Orthopedically Handicapped: Concept, Types, Characteristics and Educational Programmes for Orthopedically Handicapped.

Unit-III:

Education of the Gifted and Creative Children: Concept, Characteristics and Educational Programmes. Creativity and Identification Process.

Unit-IV:

- (a) Learning Disabled Children: Concept, Characteristics, Identification and Educational Programmes.
- (b) Education for Juvenile Delinquents: Concept and Characteristics. Anti Social and Character Disorder. Educational Programmes for Rehabilitation.

Assignment

Preparing a lesson plan using role play/street play Model and implementing the same in the class of special children.



Transactional Strategies

The course content will be transacted through lectures, discussions, interactive sessions and multimedia presentations.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be for evaluation which shall be done on the basis of sessional work.

Readings

1. Bhargava, M. (2004), Exceptional Children: Their Education and Rehabilitation, H.P. Bhargava Book House, Agra.
2. Dash, M. K. (2008), Inclusive Education, Harprasad Institute of Behavioural Studies, Agra.
3. NCERT (1987), Scheme of Integrated Education for Disabled Children, NCERT, New Delhi.
4. NCTE (2004), Some Specific Issues and Concerns of Teacher Education, NCTE, New Delhi.
5. Panda, K.C. (1997), Education of Exceptional Children, Vikas Publishing House, New Delhi.
6. Pandey, R.S., & Advani L. (1995), Perspectives in Disability and Rehabilitation, Vikas Publishing House, New Delhi.
7. Rao, V.K. (2004), Special Education, APH Publishing Corporation, New Delhi.
8. Sharma, P. (1988), Teachers Handbook on IED Helping Children with Special Needs, NCERT, New Delhi.
9. Sharma, R.A. (2008), Fundamentals of Special Education. R. Lall Book Depot, Meerut.
10. Sharma, S. (1999), Understanding and Educating Blind, National Psychological Corporation, Agra.
11. Singh U.K. (2004), Special Education, Commonwealth Publishers, New Delhi.



801 & 802 -C: Elementary Education

Marks-100 Credits-4

Objectives

The student teachers will be able to:-

1. Understand the role of Elementary and Non- Formal Education in India.
2. Develop proper understanding of various components of NPE-1986 and review of NPE- 1992 related to Elementary Education.
3. Understand the role of local bodies, state government and non-government organizations.
4. Know about various programmes related to Elementary Education.
5. Identify suitable methods of teaching For Non-Formal Education.
6. Understand the place of Non-Formal Education in the teacher training curriculum.

Contents

Unit-I:

Brief history and concept of elementary education and its Constitutional Provisions. National Policy on Education 1986 and the revised policy of 1992 with special reference to Elementary Education.

Unit-II:

- (a) Role of Panchayats, local bodies, state governments and non-governmental organizations in Elementary Education: Special qualities of an Elementary school teacher. Need for orientation and refresher courses for elementary school teacher. Role of basic training centres and DIETs in providing training to Elementary school teacher.
- (b) Programmes related to Elementary Education- MLL, ECCE, DPEP, EGS & AIE, SSA.

Unit-III:

- (a) Introduction to Non-formal Education: meaning, nature, scope and importance, difference between Non-Formal, Formal and Informal Education. Agencies of Non- Formal Education.
- (b) Functions of Non-Formal Education with special reference to all round development of rural people. Psychological and sociological bases of Non-Formal Education.

Unit-IV:

- (a) Curriculum for Elementary and Non-Formal Education.



- (b) Modern methods of teaching in Elementary and Non-Formal Education.
- (c) The place of Non-formal Education in the Teacher Training Curriculum.
Organization of Non-Formal Education.

Assignment

Visit to an elementary school and preparation of status report about various facilities provided in the school.

Transactional Strategies

The course content will be transacted through lectures, interactive sessions, group discussions and field trips.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and 20 marks will be for evaluation which shall be done on the basis of sessional work.

Readings

1. Jolly K.G. (1992), Literacy for all by 2001: Strategies at District Level, D.K. Publishers, New Delhi.
2. Mehta, P.L. & Poonga, R. (1997), Free and Compulsory Education, Deep & Deep Publications, New Delhi.
3. Mich, Ivan (1972), Deschooling Society, Penguin, London.
4. Naik, J.P. (1975), Elementary Education in India: A Promise to Keep, Allied Publishers, Bombay.
5. Rajput, J.S. (1994), Universalization of Elementary Education: Role of Teacher Education, Vikas Publishing House, New Delhi.
6. Rao, D. (1998), Economics of Primary Education, Rawat Publications, Jaipur.
7. Rao, Digumarti Bhaskara (1997), Success Story of a Primary Education Project, APH Publishing Corporation, New Delhi.
8. Reimer (1972), The school is Dead, Penguin, London.
9. Report of the National Seminar on Non-Formal Education (1980), Department of Education, South Gujarat University, Surat.
10. Shah, A.B. & Bhan, S. (1980), Non-Formal Education and the NAEP, Oxford University Press, Delhi.
11. Talesra, H. (1978), Non Formal Education, Himanshu Publications, New Delhi.



801 & 802- D: Educational and Vocational Guidance

Marks-100 Credits-4

Objectives

The student teachers will be able to:-

1. Understand the Importance of Guidance in school.
2. Identify the difficult areas in learning of various school subjects.
3. Understand the types of guidance.
4. Acquaint themselves with various services in Guidance.
5. Realize the importance of counseling services in school programmes and career orientations.
6. Gain knowledge about organization of guidance services in schools for children having problems in learning.

Contents

Unit-I:

- (a) Meaning, nature, principles and needs of guidance.
- (b) Objectives and functions of guidance services at Primary, Secondary and Higher education levels.

Unit-II:

- (a) Types of Guidance:-Educational, Vocational and Personal.
- (b) Concept of informatory, preparatory, placement and follow- up services.

Unit-III:

Counselling: meaning, types, methods and techniques for children with specific learning disabilities.

Unit-IV:

- (a) Anecdotal and cumulative records.
- (b) Role of guidance services in the measurement of intelligence and personality tests.
- (c) Role of guidance in school management.

Assignment

Preparing a special guidance programme for secondary students to meet out the challenges in the present day scenario.



Transactional Strategies

The course content will be implemented through lectures, discussions, interactive sessions and multimedia presentations.

Evaluation

The course content will be of four (4) credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and 20 marks will be for evaluation which shall be done on the basis of sessional work.

Readings

1. Aggarwal, J. C. (1999), Educational and Vocational Guidance and Counselling, Doaba House, New Delhi.
2. Clifford, P.F. (1958), Guidance Services in Schools, McGraw Hill Book Co. Inc., New York.
3. Super, Donald B. (1962), Appraising vocational fitness, Harper and Brothers, New York.
4. Erickson, Clifford E. (1947), A Basic Text for Guidance Workers, Prentice Hall Inc., New York.
5. Hoose, Willian N. Van (1979), Counselling and Guidance in the 20th Century, Houghton Mifflin Co., Boston.
6. Jones, A.J. (1963), Principles of Guidance and Pupil Personnel Work, McGraw Hall, New York.
7. Kochhar, S.K. (1997), Educational and Vocational Guidance in Secondary Schools, Sterling publication, New Delhi.
8. Peters, H.J. and Hanson, J.C. (1968), Vocational Guidance and Career Development, Macmillan, New York.
9. Strang, Ruth (1933), The Role of Teacher in Personnel Work, Teacher College, Columbia University.
10. Singh, R. (1994), Educational and Vocational Guidance, Commonwealth Publication, New York.
11. Pandey, K.P. and Bhardwaj, Amita. (2007), Educational and Vocational Guidance in India, Vishwavidyalaya Prakashan, Varanasi.

801 & 802 E- Value Education

Marks-100 Credits- 4

Objectives

The student teachers will be able to:-

1. Understand the nature, meaning, need and sources of values.
2. Get acquainted with various bases of values.
3. Get familiar with main categories of human values.
4. Gain the knowledge of various ways and means of inculcating values among students.
5. Acquire the ability of achieving the objectives of value education at School level.

Contents

Unit-I:

- (a) Meaning, nature and need of values.
- (b) Meaning, nature, objectives, importance and scope of value education. Approaches to value education.

Unit-II:

Theoretical bases-

- (a) Philosophical perspective Four Purusharthas- Virtue, Wealth, Pleasure, Self- realization. Self-Realization- Panchakosha- Annamaya, Pranamaya, Manomaya, Vijnanamaya, Anandmaya.
- (b) Social Cultural Basis- Family, Neighbourhood, Religion, Education, Institute, Constitution, Traditions.
- (c) Psychological Basis of value development- Cognitive development approach by Lawrence Kohlberg- pre conventional, conventional and post conventional.

Unit-III:

Eight Categories of Human Values-

- (a) Social Values- friendship, love, brotherhood.
- (b) Aesthetic Values- beauty.
- (c) Intellectual Values- knowledge, attainment of truth.
- (d) Ethical Values- truthfulness, Justice, benevolence, self-control.
- (e) Religious Values- worship, devotion, commitment.
- (f) Health Values- Sound, Mental and Physical health, efficiency and productivity.
- (g) Recreation Values- Leisure activities that enrich the life of an individual.
- (h) Economic Values- instrumental in other values.

Unit-IV:

- (a) Ten values to be inculcated through education: Dignity of Labour, National Integration, Patriotism, Sensitivity, Gender Equality, Courtesy, Secularism, Tidiness and Scientific temper
- (b) Learning Value through various activities: Student self-government, celebration of festivals of different religions and communities, tree plantation, organizing campaigns on sanitation, nutrition etc. Participation in community development activities, service to needy, carrying out relief activities.

Assignment

- 1. Study of essays and articles on value concerns, autobiographies and biographies, parables, episodes from real life. Listening speeches, poems and songs. Discussion, debates and competitions for value clarification.
- 2. Dealing with value dilemmas: Enactment, role play, simulation, jurisprudential Model, street plays.
- 3. Preparing a lesson plan using role play /simulation/ jurisprudential/ street play model and implementing it.
- 4. Visit to community affected by a calamity and writing a report regarding relief programme based on group work.

Transactional Strategies

The course content will be transacted through interactive sessions, lectures, tutorials, demonstrations and group work.

Evaluation

The course content will be of 4 credits which are equivalent to 100 marks. Out of this 80 marks will be for summative evaluation (final exam) and rest 20 marks will be awarded on the basis of sessional work.

Readings

- 1. Damle, Y.B. (1967); 'Education and Social Values', paper presented in the conference of Indian Sociologists (October, 14-16, 1967): Indian Sociological Society, Bombay.
- 2. Hartog Philip; 'Some aspects of Indian Education: Past and Present': Oxford University Press, London.
- 3. Havighurst R.J. (1953); 'Human Development and Education' : Longman's Green & Company, New York.

4. Jois, Justice M. Rama; 'Human Rights and Value Education': NCTE, New Delhi.
5. Kabir Humayun (1961); 'Education in New India': Asia Publishing House, New Delhi.
6. Meyer J.R. (1976); 'Reflections on Value Education': Wilfrid Laurier University Press, Canada.
7. Mukerji R.K. (1949); 'The Social Structure of Values': Macmillan & Company, London.
8. Mukerji R.K. (1964); 'The Dimension of Values, A Unified Theory': George Allen and Unwin Limited, London.
9. Mukerji S.N. (1960); 'Education in India: Today and Tomorrow': Acharya Book Depot, Baroda.
10. Piaget, J. (1960); 'The Moral Judgment of the Child': Free Press, New York.
11. Smith H.C. (1966); 'Sensitivity to People': Mc Graw Hill Company, New York.